MUNICIPAL JOURNAL AND ENGINEER

Copyright, 1902, The Municipal Journal Publishing Company

VOLUME XIV NEW YORK, JANUARY, 1903 NO. 1

NEWARK: THE METROPOLIS OF NEW JERSEY

Immense Manufacturing Interests—A Fine Water Works System—A Splendid Library—The Possible "Greater Newark" Larger Than Boston

THERE is an inclination on the part of many municipalities to enlarge their borders, following the example of Chicago and New York. Newark, N. J., has had an ambition of this kind for many moons. One of the promoters of this idea recently remarked, "Of course it is ridiculous to compare Newark with Boston; the former has an area of twenty-one and the latter ninety-one square miles, while Boston's population is 560,892, according to the census of 1900, and Newark's is 246,070. If an area equal to that of Boston is added to Newark, thus making the 'Greater Newark,' it would include Jersey City, Elizabeth, the Oranges, Harrison and Kearney, the combined population would exceed that of Boston by 17,000. Besides, the manufacturing interests of the greater city would exceed Boston's by several millions in valuation.

"Take another instance, that of Buffalo, the Queen City of the Lakes, has outstripped Newark both in population and manufacturing since 1880, but in doing so her territory has been extended, now including thirty-nine square miles. Give Newark an equal area and it would outrank Buffalo, as it would include the Oranges, Harrison, Kearney, Montclair, and Bloomfield, with a combined population of over 360,000, while Buffalo would number but 352,000. However, the manufacturing interests of Newark exceeded those of Buffalo in 1890, by about $4,000,000, and if the interests of the additional territory were included, the excess would be increased to $15,000,000 or $20,000,000.

The friends of Newark are pushing her interests and advancing her material prosperity in every possible way. One of the recent undertakings to this end is the preparation for the construction of a larger city hall. This is an improvement which has long been needed, the present one, built in 1836, and remodelled in 1888, being totally inadequate to the city's needs; the police, fire, health, water, sewer, and street departments, all being forced to go elsewhere for office room, which causes great inconvenience in administering the city's affairs.

THE PROPOSED NEW CITY HALL OF NEWARK

The total cost, including the site of the proposed new city hall, will be about $2,000,000. It will have ample room to house all the various departments of the administration. In addition to this, it has planned to expend $1,500,000 for a new receiving reservoir in connection with the water works, thus completing the water supply, which has already cost some $6,000,000. The Park Commissioners want to expend $2,000,000 more, in addition to the $4,500,000 which have already been appropriated for their purpose. The expenditures for pavements and sewers the coming year will aggregate something like $500,000, while the city will have to bear its share toward the construction of a $6,000,000 trunk sewer, proposed to carry the sewage of the Passaic Valley out to the ocean.

Newark's boast of being one of the greatest manufacturing cities in the world, and a glance at a summary of its assets will justify its claims. According to data furnished by the Board of Trade, the city's total taxable valuation amounts to $163,303,000. The tax rate is 2.10 on a two-thirds valuation, while the annual revenue exceeds $10,000,000. There are 35,800 buildings within the city limits. The annual departmental expenditures are as follows: For police, $425.000; fire, $300,000; public health, $75,000; public market, $20,000; city hospital, $65,000; private hospital, $15,000; city home, $86,000; poor and alms, $40,000; streets and highways, $275,000; public scavenger, $75,000; public lighting, $215,000; sewers and drains, $61,000.

These figures do not include the transactions of the water works system which is the only public service utility owned and operated by the city. The present capacity of this plant is 50,000,000 gallons daily, with an average consumption of 30,000,000. There are 275 miles of mains, 2,200 hydrants, and 3,500 taps. The plant is valued at $10,000,000, and has a yearly revenue of $775,000. The supply is collected in the mountains of Northern New Jersey and delivered by gravity.

The latest figures in regard to pavements, furnished by the City Engineer, gives a total street mileage of 225, of which 135.38 are paved, there being 51.02 miles of sheet asphalt, 41.31 miles of oblong granite block, 13.76 miles of Telford, 12.29 miles of Belgian block, 10.81 miles of cobble stones, and 6.19 miles of brick.

An effort is being made to rid the streets of the above-ground wire nuisance, the private companies, including the telephone, telegraph, and electric light being obliged to place their wires underground in a limited section. This area will gradually be extended as the needs may require. The 225 miles of streets and avenues of the city are lighted under contract, by a private corporation, there being 2,025 gas lamps; 1,725 1,000-candle power electric arc lamps, at an annual cost of $215,000.

The General Superintendent of Works has charge of the streets and highways, sewers and drainage, cross walks and side walks, public grounds, public baths, public lighting, wharves and bridges. The sewer system includes 155 miles of sewers, of which 89 are vitrified pipe and 68 are built of brick, and 2,728 catch basins. It cost $8,347.16 to clean the catch basins during the year, and $7,877.25 to clean the sewers. There were removed from the basins and sewers 10,412 cubic yards of matter and from the chambers and pumping station, which were cleaned six times during the year, there were removed 3,065 cubic yards. The total cost of the sewer work for the year amounted to $44,759.81.

AN EARLY MORNING SCENE AT CENTRE MARKET

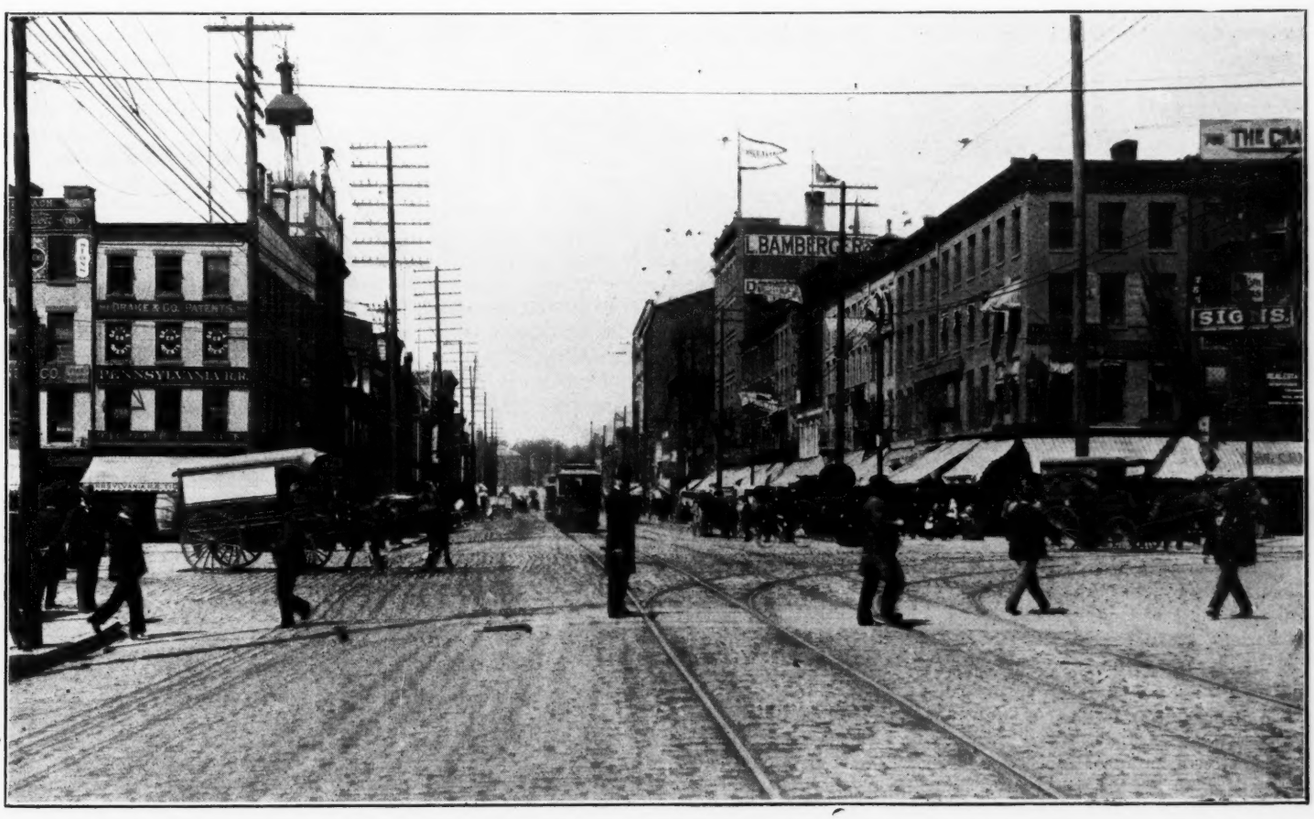
The public baths form one of the interesting features of Newark's city government. One of them was established as far back as 1896, but neither of them are run all the year round. They are generally opened on the first of May and closed early in December. The total attendance for the two bath houses during the year 1901, amounted to 81,820 males and 10,585 females, making a total of 92,405. The baths are practically free, a small charge only being made for the hiring of certain rooms, towels, and suits. The entire revenue from this source amounted to only $333.95 for the season. A third bath house has been completed during the past fiscal year and was opened to the public early in the season. The total cost for operating the bath houses amounted to $19,744.72 in 1901.

The city of Newark is in great need of a larger park area. The park area owned by the city amounts only to 19.16 acres; but there are some 312 acres of park not owned by the city. Jersey City has 22 acres of parks, while all the other cities in Newark's class, have park areas of not less than 500 acres and several of them over 1,000. It is gratifying to notice, however, that the trees in these small parks are

carefully watched by the superintendent. During 1901, many old trees were cut down and nearly 100 new trees planted in their places, besides the setting out of a large number of shrubs and bushes. The total cost for operating this department was $5,117.67.

The city may well be proud of its educational institutions. It has forty-six public schools with 786 teachers, 38,125 pupils, the property being valued at $2,632,000, the affairs of the department being run at an annual expense of $900,000. Besides these public schools there are sixty-one private and parochial schools, with 15,000 pupils, the property being valued at $600,000; six colleges, three academies, and one technical school.

There are few cities in the United States, when population is taken into consideration, that can boast of a more beautiful and thoroughly equipped library than is possessed by Newark. This building was only completed in 1901, and was fully described in a former number of the MUNICIPAL JOURNAL AND ENGINEER. The cost of the building was $350,000, and the books $90,000, there being 77,297 volumes. The annual cost of maintenance is $40,000 and the number of volumes circulated in 1901, amounted to 341,899, with eight delivery stations.



VIEW ON MARKET, ONE OF NEWARK'S BUSY STREETS

The police and fire departments will compare favorably with any city in the country when measured by the standards of efficiency. The former has a total force of 382 under the charge of a board of four commissioners. The city is divided into four precincts. The executive officers of the department consist of one chief, four captains and fifteen sergeants. The regular force consists of seventeen detectives and three hundred and twenty-one patrolmen. The permanent officers of the fire department includes 206 paid men, also under the control of the board of four commissioners. The equipment includes sixteen steamers, twelve hose wagons, six trucks, four chemical engines, eighty-eight horses, 30,000 feet of hose and 2,132 hydrants.

There are eight cities in the United States varying in population from that of New Orleans, 287,104, to Minneapolis, with 202,718. Newark is included in this list. Comparing the assets of these eight cities cannot fail to be of interest and it certainly will be to the credit of Newark. Summing up the assets, as enumerated by the Hon. Carroll D. Wright, in his recent statistical report on the cities of the United States, and including the cash in the treasury, sinking fund, trust funds, land and building values, departmental equipments, public schools, hospitals, libraries, parks, jails, reformatories, asylums, almshouses, etc., the aggregate to be placed to the credit of the eight cities mentioned would be as follows: New Orleans, $17,211,194; Detroit, $26,627,383; Milwaukee, $19,442,513; Washington, not including apparatus, etc., for city hall, $15,800,404; Newark, $33,762,694; Jersey City, $21,199,893; Louisville, $16,052,342; Minneapolis, $19,375,038.

The per capita debt of these eight cities is given as follows: New Orleans, $59.68; Detroit, $16.28; Milwaukee, $23.06; Washington, $49.25; Newark, $58.05; Jersey City, $75.88; Louisville, $38.75; Minneapolis, $31.82.

While Newark possesses greater total assets than any of the other cities, it stands third in the list when measured by the per capita assessed valuation of real and personal property, which, for the eight cities, is as follows: New Orleans, $458.58; Detroit, $824.16; Milwaukee, $555.38; Washington, $672.13; Newark, $621.90; Jersey City, $447.63; Louisville, $577.21; Mineapolis, $486.73.

When a comparison is made of the total per capita expenditures for maintenance of the police department, including police courts, jails, work houses, reformatories, etc.; fire department, public schools, municipal lighting, street expenditures, and for all other purposes, the honors are about evenly divided among these eight cities, which would seem to indicate that they are about equally well governed. The per capita cost as determined by Mr. Wright, for these eight cities, is as follows: New Orleans, $14.33; Detroit, $13.52, not including expenditures for street sprinkling, paid for by property owners; Milwaukee, $12.55; Washington, $18.77, including expenditures by the U. S. Government for water works, but not including expenditures for lighting public parks and spaces, and two dollars paid out of the sinking fund; Newark, $14.95, not including expenditures for street sprinkling, paid for by property owners; Jersey City, $16.85, not including expenditures for street sprinkling, paid for by property owners; Louisville, $12.91; Minneapolis, $14.02.

THE VALUE OF MUNICIPAL ASSOCIATIONS

Recognized by European and English Cities—Too Many Organizations of Similar Aims—A Federation of National Associations Needed

By the Editor

THE value of municipal leagues is to be measured by results. Owing to the fact that the field is so broad, the workers so widely scattered and many of the results so indirect, it is difficult to define all the benefits achieved by national or state effort. The field of the local league or improvement association is so limited that the result of its effort is more readily discernable by its members and the public and, therefore, the excuse for its existence is more apparent. For this reason there is no serious criticism made against the local league; hence, there is no especial need of enumerating the benefits derived from local effort for the sake of creating public sentiment in its favor. It is already strongly intrenched in the good will of the public.

SEVERELY CRITICISED

But the popularity of the national and state organizations is not so assured. In fact, there have been some serious criticisms made against them and their real usefulness has been gravely questioned. It is for the purpose of refuting these charges that I enumerate some of the benefits of these organizations.

One of the common criticisms made is that it is a waste of the taxpayers' money to defray the expenses of a delegation to the annual gatherings of the league. There has been some ground for this criticism. There has been some money wasted. More money has been expended in some instances, no doubt, than was necessary. But this has been the exception and not the rule, and, therefore should not be used as an adverse argument. There are many good reasons why every city should pay the expenses of a good sized delegation to national and state conventions every year. The old saying, "Save at at the spigot and waste at the bung," is *apropos*, when applied to the short sighted policy of some cities in refusing to send a delegation to this meeting, or, in sending too small a one. In my estimation, no city of 20,000 population, or over, can afford not to be represented. The delegation should include the Mayor, the head of each department and one or more of the Council. In this way and in this way only can the greatest possible benefit be derived from these national gatherings. If a smaller delegation is sent, it means that an important department will be without representation; and, therefore, that particular department will be defrauded of the benefit which rightfully belongs to it. For instance, it would be impossible for the mayor to cover the whole field properly for the city, for he is not an engineer, nor an electrician, nor a sanitarian. He could not rub up against all, or, in fact, any of the men representing these varied interests from other cities and obtain from them the points in their experience which would be particularly valuable in the solution of his city's problem along these lines. It needs the mind that is trained in these particular fields to pick up the experience which will be valuable in its application to work in hand. It is the personal contact at these meetings of men of like training that affords one of the strongest reasons for the existence of the league, and one which is most productive of good results. The taxpayers' money would be made to go further, because the city official would learn how to do his work more economically.

SIMILAR ASSOCIATIONS WORK WELL ABROAD

English and European cities have their municipal organizations of various types; such as the street cleaning superintendents, surveyors, etc., but there is less need of their coming together in annual session, because their tenure of office is much longer, extending over lifetimes, as their office does not depend upon political favor in any degree; but even there these organizations have been proven to be almost an absolute necessity. Here there is greater need for them, because of the frequent changes which are made in the personnel of a city's administration. A mayor, or head of some important department, no sooner obtains a mastery of the situation and arrives at the point where he can be of most good to the city, than he has to step down and out, to make room for a successor of another stripe of politics. He in turn goes through the same process, and, in nine times out of ten, meets with the same fate as his predecessor, for the pendulum of political favor swings first one way and then the other. The result is that the American city official is usually unaccustomed to his suroundings, has had little or no training in the management of the department of which he has been placed in charge; hence, there is the more urgent need for him to profit by the experience of his brother officials who have been in office for a longer period.

Attendance at this meeting affords the city official just the experience that a boy gets in college, which really becomes one of his most valuable assets in after life; viz., the personal contact with his fellows. This contact spurs him on to a greater and more earnest effort; it takes the conceit out of him and demonstrates to his satisfaction, whether he admits it or not, that "there are others;" it brightens his wit and sharpens his perception; it engenders the desire to excel.

I believe that national and state leagues are among the most potent influences now at work for civic betterment. The greatest good resulting from their combined efforts is not in the reformations they bring about by agitation, but rather in the vast amount of information disseminated. The wide diffusion of intelligence concerning municipal affairs during the past five or six years has been due, more than to any other one agency excepting the press, to the work of the national and state leagues. The league has performed a great public service by having discussed, pro and con, upon its platform, among other questions, that of public ownership of public utilities. Speakers upon both sides of the question have had oportunities to give their views, and their words have been published from one end of the land to the other, over and over again; they have been quoted in public debates in the hamlet, village, town, city labor organization and in numerous colleges and universities. The arguments, either for or against, when once uttered in the forum of the League, have not ceased to have their influence upon public thought and action. The published proceedings of these associations form the vehicle of thought which makes the arguments more lasting in their value and results.

EXCELLENT WORK OF STATE LEAGUES

One of the direct results of the work of these organizations has been the formation of a score or more of state leagues, whose work has been laid out along similar lines and only limited in scope by state boundaries. Among these are Ohio, Illinois, Michigan, Indiana, Wisconsin, Iowa, Nebraska, Colorado, California, Texas, Alabama, Florida, Pennsylvania and Connecticut. They meet from one to four times a year. For obvious reasons, the influence of the state league is more potent upon the state legislatures than that of the national. By the combined efforts of the different cities of the state many evils may be corrected. The important questions which have occupied the attention of all of them, more or less, have been taxation, special assessments, home rule and improved charter conditions. Indiana, Illinois, Wisconsin, Iowa, and California have realized benefits of this kind within the past year or so, and all of the states organized are seeking better civic conditions. It is not at all to the credit of the Empire State, that it has failed, thus far, to organize a state league.

The name of the municipal association is legion. Among the more important ones are the National Municipal League, which devotes its energies to the discussion of municipal government from the theoretical standpoint. While this is an organization which gives considerable time to the splitting of hairs, and while its membership knows next to nothing of practical civic affairs, from actual experience, it has, nevertheless, accomplished much good, and is to be considered as one of the valuable agents at work upon the civic problem. It has created what it calls "A Model Municipal Program" in the course of its operation which has been of untold benefit to scores of cities in amending their charters. It has not been without its effect upon state

legislation, for indirectly it has influenced the passage of improved legislation governing cities in the states of Indiana, Wisconsin and Ohio.

The membership of this league includes more than a hundred affiliated organizations, principally boards of trade, chambers of commerce and similar organizations, as well as a large number of public spirited men throughout the country. Its inception and continuance has been more largely due to the personal efforts of its secretary, Hon. Clinton Rogers Woodruff, of Philadelphia, than to any other one man. The attendance at its annual gatherings is smaller than that of any other society of its kind, there seldom being more than fifty present. A large part of its work is performed by special committees through the year, and thus it has been able to conserve its energies and multiply the fruits of its labors. At present it is doing yeoman's service upon a scheme for uniform municipal accounting among other important questions.

Some of the More Important Organizations

Next in importance, and with a field more closely akin to that of the League of American Municipalities, is the American Society of Municipal Improvements. Its membership is largely confined to those who are actually engaged in municipal work. The engineer dominates the society and, therefore, its subjects for discussion are largely of that character. Its field is more limited in extent, but not in importance. The results of its labors have been greater than could be enumerated. Its deliberations have always been of a dignified and earnest character, and the papers presented for discussion compare favorably with the best, as a reading of its annual proceedings will demonstrate.

There is the American Park and Outdoor Art Association, the national fire and police associations, not to mention the hundred and one technical associations which have a more or less direct bearing upon the municipal problem. All of these assist in the creation of a more perfect municipality.

There are organizations galore. It is by no means uncertain that there are enough. It would not be a difficult proposition to establish that there are too many. But still they come. A "Society of Municipal Has Beens" is the latest product. Naturally enough it emanates from the "Nutmeg" state of Connecticut. This unique body confines its membership to those who have held some municipal office. By the acceptance of another a member forfeits his membership.

It is always in order to push a good thing along, but in the multiplication of organizations appears the dry rot which threatens the existence of those already in the field. Here is an opportunity for the League of American Municipalities to achieve future greatness. It should appoint a committee whose sole object for existence should be the consummation of an amalgamated union of all municipal associations, or, at least a close federation, which would tend to prevent further incursions upon the well occupied municipal field. Federation could be accomplished without destroying the identity of any of these organizations. It would in no sense diminish the opportunity of any of them, for such a federation could be made to work as harmoniously as that existing between the several states of the Union. Each could carry on its own special work and each could seek to excel.

A Federation Should Be Formed

Such a federation would afford a better opportunity than now exists for utilizing the combined energy and intelligence of the several associations in the consideration of certain subjects, such as uniform accounting, public ownership of public utilities, etc. An executive board of managers, whose membership should be made up of chosen representatives of the various organizations, could have headquarters in New York and Chicago. A moment's reflection will show why such an arrangement could be made of lasting benefit not only to the associations themselves, but what is far more important, greater benefit to the city.

There is another good result which would naturally accrue from such a federation. Instead of having these various organizations meet at different times and places during the year, a common meeting place could be selected and a given period of time determined upon, during which each one of the several associations could occupy one or more days. Such an arrangement could be made the basis of a summer school for municipal economics, and, if the same place were selected year after year, and that were the place of the headquarters of the federation, the effect would be cumulative in value. It is not difficult to see how such an arrangement would save time, money and energy. It involves the consummation of a result which is well worth the consideration of these important associations. There has already been expressed, among other civic organizations, a desire for something similar, but it has not been clearly defined, nor has it taken definite shape.

There are three ways in which the city official can inform himself; viz., by study, including periodical and other literature upon municipal topics; second, by travel and investigation; third, by attendance upon meetings similar to this. The last named involves the other two, so that it may be looked upon as the best of the three. No really progressive city official, in these days, is willing to admit that he does not make some effort and go to some expense, even if it be his own, to keep himself abreast of the times.

GOOD ROADS IN NEW JERSEY

Under the law providing for State aid in road building, New Jersey has now completed 796 miles of stone roads, toward which the State has appropriated $1,265,168. According to the report of State Road Commissioner Henry I. Budd, a continuous highway has been made from Jersey City to Atlantic City. In addition to the amount of work that has been done by and through the help of the State, many of the counties in northern New Jersey have built their roads independently, so that there are more than 1,000 miles of good roads in the State at the present time. Mr. Budd desires that the work should be pushed forward rapidly, and asks that $300,000 be set aside by the legislature for the work. This is an increase of $50,000 over that of the past year. During 1902 the total mileage built was 155, for which the State paid $250,000. Specifications have been drawn for 96 miles, which will cost about $476,600. In addition to the 155 miles built and paid for, 45 miles of roads were completed, for which the State has not yet paid its share.

Mr. Budd is an advocate of Federal aid in road building. He says, "In no way can our government add so rapidly to the prosperity of the nation as by contributing of its surplus to the macadamizing of the highways of the settled portions of the country, and thus enable the present generation to save millions in transportation and also make the sections already partly settled so desirable that the inhabitants will not wish to leave them. There is not much hope of general road improvement in the country until the National Government, as in ancient Rome and modern France, becomes their foster father."

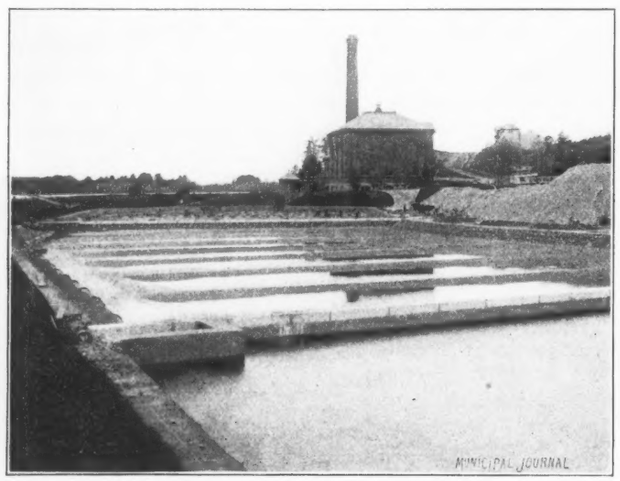
In 1902 seventeen counties partook of the State's bounty in road building, and two counties presented petitions to their Boards of freeholders that have not as yet received recognition. Mr. Budd says that much of the road work was delayed because in many of the counties the freeholders did not think they had the authority to advertise for bids until after they make their appropriation at their annual meeting. Thus the best road building months in the year, March, April and May, are lost, and the hot months of July, August and September, when men and teams are needed in the fields, have to be devoted to building roads. Consequently Mr. Budd recommends that power be given to the freeholders to make contracts for the coming year at any time after the first of November. Burlington county holds the record for road building last year. This county builds all the roads that the State law will permit, and in 1902 constructed nineteen miles, which makes a total of 141 miles improved since the passage of the State aid law.

THE LAWRENCE FILTRATION PLANT

The First Large Sand System to Be Built in This Country—Efficient in Reducing Typhoid Death Rate—Capacity Must Be Increased

*By J. Rodney Ball**

During the years from 1873 to 1876, when the water works of the city of Lawrence were under construction, a filter gallery of stone and brick was built, eight feet by three hundred, in vertical and horizontal diameter, extending down stream to a direct inlet and conduit, eleven feet below the low water level of the Merrimac River. From this gallery, an iron pipe, thirty-six inches in diameter, and one hundred and thirty-two feet long, beginning at the river, extended through some thirty-eight feet of four-foot brick conduit to a well beneath the pumping station. From this well the water was pumped into the reservoir for distribution.



FILTER BEDS AND PUMPING STATION AT LAWRENCE

This system sufficed for some years, and although the legislature by special enactment, in 1878, made the Merrimack River a receptacle for sewage, the water supply was not disturbed until 1892. Typhoid fever had become unusually prevalent during that year, and the matter was taken up by the Massachusetts State Board of Health. After much investigation into the existing conditions, the board came to the conclusion that the only remedy for the contagion, which was becoming very serious, was to purify the city's polluted water by means of the English sand filtration system.

The First Sand Filter in the United States

The Lawrence filter, the first of any size to be built in America, was designed by Chairman Hiram F. Mills, of the Massachusetts State Board of Health, a Lawrence man, who was thoroughly cognizant of the city's needs in this direction. It is of irregular outline, being seven hundred and fifty feet in length, with an average width of one hundred and forty feet. Its two and thirty-six hundredths acres of filtration surface, which is divided by transverse carriers into twenty-five beds, has a daily capacity of five millions of gallons.

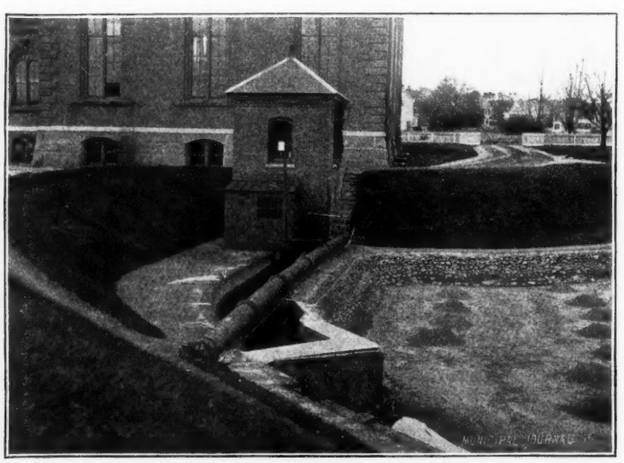
In constructing the filter, the bank and bed of the river were excavated to a general depth of seven feet below the usual low water mark, and an embankment, nine feet above low water mark was built to avert all danger from freshets. From the old gallery, a circular main conduit was extended eastward in the filter beds, running parallel with the northern edge of the filter, some twenty feet south of it. The conduit was built of brick, laid in end joints, without mortar, leaving spaces of one-eighth of an inch, for the entrance of filtered water. It is two feet in diameter for the first one hundred and five feet, gradually lessening in size, until at the end of the four hundred and seventy-foot length, it is of six-inch vitrified pipe. The entire conduit is surrounded with some eight inches of gravel, the inner four inches being of two-inch stones, which decreases in size as the exterior is reached.

From this conduit, which is pierced at suitable places, lateral under-drain pipes extend south, at thirty-foot intervals, on the excavated bottom, with a fall of about one inch in one hundred. The pipes are laid, beginning at the main conduit, one length of ten-inch, two lengths of eight-inch, sixty-five feet of six-inch, ending with three lengths of four-inch, the spigot end of each approaching, but not entering the bell end of the next. The entire drain system is covered with the under drain material, four inches of two-inch stones, three inches of one and one-half inch gravel stones, one inch of three-quarter inch gravel, one of three-eighths, and one of three-sixteenths, until the last inch is of coarse mortar sand. The larger stones were all picked, washed, and placed in position by hand, but those of smaller size were screened and shoveled into place. In sanding, the material is put on, to the depth of about five feet, over that portion of the beds which is excavated to the greatest depth, and spread to a distance of five feet each side. Between the under-drains, and over the ridges of excavation, the sand is but three feet deep, and is spread over twenty feet.

Details of Construction

In this manner the lowest portions of the filter are made to be directly over the ridges of excavation, midway between the under drains, the surface level of these parts being three feet below mean low water mark, and one foot below the sand surface over the under drains. Over the center lines of ridges and under drains, the surface is flat for a distance of five feet, but between these areas, the slope is one inch in ten, the form being thus in order that there shall be no disturbing elements during the process of intake.

The old conduit, formerly used to carry water directly into the pumping station, is pierced at the water's edge, and a chimney, containing two two-foot pipes, with gates, was built. One of these pipes supplies the distributing channel, which follows the southerly edge of the filter to a point within thirty-five feet of the easterly end,



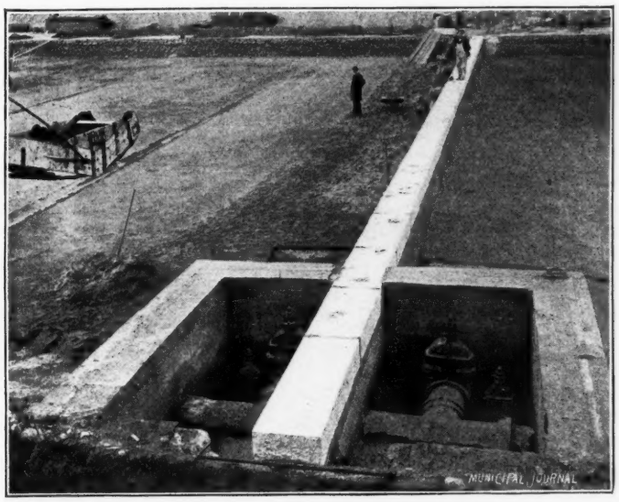
GATE HOUSE AND PORTION OF BED AFTER SCRAPING

while the other is for future use. The elevation of the edge of this channel next the filter remains uniform with that of the sand, i. e., about three feet below the river's low water mark. At the western end it has a semi-circular radius of five feet, which at the opposite

* Lawrence, Mass.

terminus, is decreased to two, and the bottom is six inches below the inner edge.

The main carrier, built of cobble stones from four to six inches in diameter, is laid in Portland cement upon eight inches of gravel.



WATER GATES AND DIVIDING WALL—SECTION ON LEFT BEING SCRAPED

The lateral carriers are of four-inch cobbles, laid in Portland cement directly upon the sand surface. In each level sand valley, a shallow distributing carrier runs to within thirty-two feet of the north side of the gallery. At the main channel, this distributor is two feet wide by three inches deep, but at the northerly end its dimensions are but one foot by one inch.

Cost of Building and Operation

The filter gallery was just one year and ten days in building, for on September 20, 1893, the water was turned into it. The actual cost of the bed was $65,500. Since that time, however, $14,880 has been spent to facilitate maintenance, and this fall $5,000 has been expended in dividing the bed into three units, making the total cost, excluding the maintenance, $85,380.

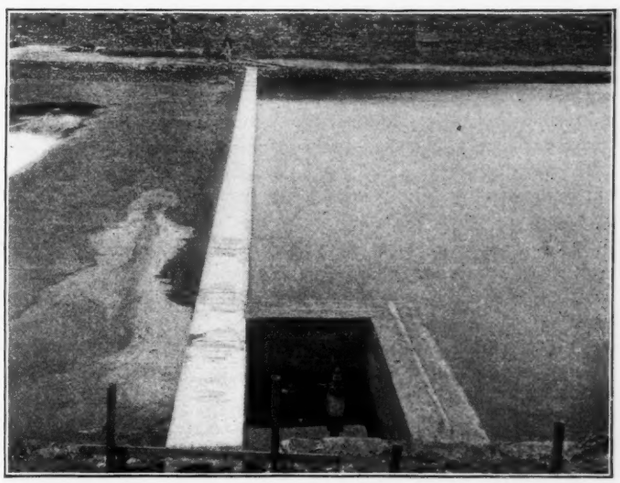
The filter, which is not provided with either a covering or a distillation plant, is open to the elements, and must dispose of the entire silt on all water which enters it. This makes the number of necessary scrapings much greater, and consequently an advance in the cost of such work. Each of the twenty-five beds is scraped, on the average, from fourteen to seventeen times in twelve months, this process entailing a cost of $4.28 per million gallons filtered in 1901.

During the months of January, February and March all snow and ice must be removed before any scraping can be done, and for this work, ice conveyors which propel themselves along a track on the river side of the bed, are used with great success. These machines have a capacity of six cakes, which they lift from the gallery, and throw into the river. Under these conditions, the cost is raised to $7.68 per million gallons. This cost of maintenance in Lawrence, is perhaps greater than in any other city using this system. In Lawrence $2.00 is paid for eight hours work, while in Albany but $1.50 is paid the workmen, and in other places this pay is given for nine hours work. Again, in no other city is there so much conveying of sand to be done, this item alone amounting to $844.06 in 1901. In regard to the difference in the cost of maintaining a closed filter, and an open one, the city of Lawrence paid $8,609.54, in 1901, for care of its filter, which amount, with the removal of snow and ice eliminated; as it would be in a closed gallery, is reduced to $4,857.68, almost one half. About 100,000,000 gallons of water is filtered per month in the Lawrence filter.

Capacity Must Be Increased

Until this year, the gallery was entirely sufficient for the needs of the city, but with the remarkable growth of Lawrence, the demand for water has correspondingly increased, and it was found impossible to tide over the winter, unless some provision were made for an added supply. The State Board was appealed to, and a conference was held, at which Superintendent M. F. Collins proposed the building of dividing walls. Two of these walls, dividing the gallery into three equal sections, with the necessary gates, would allow two units to be working, while the third was drawn off for scraping purposes. This method, while not increasing the area of the bed, would save considerable time, for then, the entire gallery had to be shut down while the scraping was going on. The State Board, however, reported that such a division would, in their opinion, be of no use whatever, and recommended the covering of the present filter, and the building of a new one at once.

The immense cost of covering this filter, at the time it was brought before the city government, together with the fact that the innumerable brick piers, which would have to be put in to support such covering, would take up considerable filtering space, influenced the disregarding of the State Board's report, and the construction of the



SECOND DIVIDING WALL AND GATE—SECTION ON LEFT FILLING

dividing walls which are proving entirely satisfactory. It is very evident, however, that this improvement will afford only temporary relief, and that in the spring another gallery must be built.

The author is greatly indebted for information upon this subject to Messrs. Knowles and Hyde, and H. F. Mills, Civil Engineers, whose papers have been widely read, and to Superintendent M. F. Collins.

THE SEPTIC TREATMENT OF SEWAGE

Discovered in England in 1852—Not Understood Till 1895—Many Small Plants Installed in This Country—Details of Construction and Operation of the System

*By Benj. H. Flynn, C. E.**

SEWAGE can be successfully purified by any one of the intermittent filtration or land processes so long as there is used an area in accord with the material at hand. In localities where the land is unsuitable, clay soil, etc., it requires such a large area for the disposal of a small quantity of sewage, or else requires the construction of artificial beds from foreign material, that the cost of installing the disposal works is excessive and beyond the means of many communities.

In the search for a process that will cut down this heavy expenditure necessary in the poorly favored communities there has been developed the so-called septic treatment of sewage together with other intensified treatments such as the contact bed, etc. With these methods it is attempted to so prepare the sewage that it can be handled much more easily by the final purification processes of dilution, filtration, further contact treatment, or irrigation.

WHAT SEPTIC TREATMENT IS

Briefly the septic treatment of sewage, consists in causing sewage to flow through a tank, or reservoir, at such a rate that each particle is a number of hours in passing the same. This tank is so designed that the sewage enters quietly at one end, flows the length of the basin and is withdrawn at the further end by means of a submerged outlet or outlets. This slow passage permits the organic matter in solution, together with the solids which have settled out on account of the slow current, to be attacked by that class of micro-organisms, which develope under such circumstances. As there is no free oxygen in stale sewage, conditions are such that in this septic tank there is developed an enormous growth of the anaerobic bacteria, minute vegetable organisms living without air, which organisms have the property of attacking organic matter and breaking it up into simpler compounds which are dissolved in the liquid sewage or pass off to the air as gas.

This principle of the liquefaction or hydrolysis of the organic solids in sewage by the action of the anaerobic bacteria has long been known though but recently understood. It is the action which takes place in every vault or cesspool and permits these receptacles to receive such an enormous quantity of solid matter before cleaning is necessary. As early as 1852, there were in use, in England, tanks for the collection of sewage for the purpose of freeing it from solid matter and this liquefaction was noted. A little later, in France, receptacles were used in which sewage was freed of its solid matter by this process of liquefaction. In the United States, beginning with 1876, there have been many small sewage disposal plants installed, in which this principle was made use of, though the theory of its working was not understood and in many cases such results as were obtained were not expected.

SEPTIC TREATMENT USED IN ENGLAND IN 1852

While this principle has been known for a great many years, it is not believed that its action was understood until about 1895, when there was constructed by Donald Cameron, the now famous Exeter, England, septic tank. About the same time, at Urbana, Ohio, and a few years later at Champaign, Illinois, Prof. C. N. Talbot constructed small tanks on this same principle.

Since the construction of these first plants the use of septic tanks in sewage purification has rapidly increased, bringing about also a much better knowledge of the principles of their working, though they are by no means thoroughly understood as yet. It must be noted that while there are a great many small septic tanks in use, no large city has as yet adopted this system, though a few are now making experiments along this line.

Since it has been demonstrated that there is much of value in the septic treatment of sewage, many claims have been brought forward of patent rights in the principles of this system, but owing to its early and wide-spread use it is not believed that the claims will hold. As far as known none have been pressed as yet and are not likely to be in the United States, especially since a number of prominent engineers have repudiated the claims and are putting in the tanks without interference.

Returning again to the operation of this system it may be stated that much detailed work has been and is now being done by the Massachusetts State Board of Health and by several municipal experiment stations in England. Much light is also being thrown on the operation of the tanks by the working of the small plants now in use in this country.

TANKS NEED NOT BE COVERED

Originally it was believed that the tanks should be covered and made practically air tight so as to provide the proper habitat for the anaerobic bacteria, whose growth it was wished to encourage. Later it was discovered that an open tank gave practically the same results as a closed one and that unless other reasons governed it made no difference whether a cover was provided or not. This result is no doubt due largely to the fact that the floating particles in the tank unite into a rather thick scum which serves to protect the sewage from the light and air. Even if this scum be broken by the wind, heavy rains, or other disturbing influences affecting an open tank, the lower portions of the basin, especially the sludge on the bottom are not reached by the air at the surface. By some investigators it is claimed that the free escape of the gas in an open tank is of benefit and may increase the bacterial action. Where the gas is partially confined in a closed tank some of it may be held in solution in the sewage where it may act as a toxin to the germs at work and decrease their efficiency. The change going on in the tank is a putrefactive one and in some cases foul odors are given off at times. If the disposal works is to be located in a populated district this fact would, no doubt, demand that the tank be covered and the gases confined to be disposed of in an unobjectionable manner. The gas given off is inflammable and has been used for lighting in at least one place.

There is much disagreement, as yet, as to the proper size of the septic tank, or, in other words, as to the length of time the sewage should be in passing through it. This phase of the question is of the utmost importance, as it seems to be demonstrated that, if the sewage is held in the tank for too long a period, poisons will be developed which will destroy the bacteria at work and render the sewage not only exceedingly foul, but also very difficult to handle in the final purification processes. Under ordinary conditions the majority of the investigators are of the opinion that the tank or tanks should hold from twelve to twenty-four hours' flow. If the sewage is compelled to travel through a long outfall sewer and is very stale when reaching the disposal works, this period may be much shortened, perhaps to even as low as from two to four hours. The strength of the sewage, also, has much to do with the time it should be held. A strong sewage, full of organic industrial wastes may well be treated for a much longer period than a weak domestic sewage diluted with much water. The character of the final purification process also may easily influence the extent of the septic treatment. If a large area, with suitable soil, is available for filtration, the septic treatment need be carried only to such an extent as will free the sewage from the heavy suspended matter, while, if but a small area is available, the maximum purification possible is desired.

* Engineer of the Ohio State Board of Health, Columbus. The subject is treated in a popular way, and therefore, in harmony with the policy of THE MUNICIPAL JOURNAL.—[EDITOR.

Septic Tank Only Partially Purifies

It must be borne in mind that the septic tank gives only a partial purification, that it is only a preparatory step in the work of final purification. Its importance, as a preliminary operation, is due to the great reduction which it brings about in the suspended matter, which reduction is produced without the accompanying large quantity of sludge so burdensome in the ordinary precipitation methods. The solid matter of the sewage settles out in the slow current through the tank and collects either on the bottom, or at the surface, where the organic matter is attacked, as stated, by the anaerobic bacteria and reduced to simpler forms, most of which are dissolved in the water, or escape as gas. These anaerobic bacteria have the power to break up such refractory solids as paper, wood fibre, all cellulose matter, in a much shorter time than the aerobic bacteria of the intermittent filter, or contact bed, can accomplish the same work. This cellulose matter in sewage is one of the chief causes of the clogging and filling up of contact beds, so that its removal in the septic tank increases very much the usefulness of the coarse grained filters.

In most cases it is advisable to pass the sewage through a grit chamber before the septic tank is reached so that all the heavy mineral matter, usually road detritus, may be prevented from entering the tank and be kept in a small chamber, where it is easily removable. This grit must not be so large that any of the organic matter will be precipitated or else its contents will become offensive and the object of the preliminary sedimentation defeated.

After the organic solids have remained in the septic tank for some time they are reduced to what may be called ash, the mineral residue from the reduction process which residue forms the permanent sludge of the tank. No extended figures are available as to the exact amount of this sludge, or of its rate of accumulation, but where the septic action is complete, the tanks fill very slowly and require cleaning only at very long periods, a year or more. If the septic action is not carried to the proper point the sludge accumulates more rapidly and the tanks require cleaning much more frequently. A reduction in the size of the tanks is followed by an increase in the expense of operation. At Exeter, where the flow of sewage fills the tanks in a little less than twenty-four hours there was, in twenty-six months, an accumulation of sludge which filled 40 per cent. of the tanks. In the Leeds experiments it was shown that 40 per cent. of the solids which entered the tank were liquefied, or gasified, and that 30 per cent. were changed and broken up into such fine particles that they were carried out in the effluent, thus leaving 30 per cent. of the original solids in the tank.

The effluent, on emerging from the tank, is usually dark in color, clear, but frequently contains small particles of partially broken up matter which have been caught at the effluent outlet and carried through, and the odor is slightly offensive and at times quite so, especially if it is aerated to free it from the gases it contains.

How the Effluent Is Purified

This effluent is then ready for its final purification which may take the form of dilution, filtration, contact bed treatment, or irrigation. Dilution may only be used as a final process where there is available a stream of such size that it is nearly able to care for the sewage without treatment. This same stream, for a considerable number of miles below the point of admission of the effluent, must not supply water for domestic use, as it is not admitted that the septic treatment destroys the pathogenic bacteria originally in the sewage.

For irrigation it is claimed that septic sewage is of special value as the organic matter is in an excellent condition to be assimilated by plants. Ordinarily, however, if sufficient land was available for irrigation it would not be necessary to give the sewage any preliminary treatment.

Considerable data are now available on the results obtained by this process, but it will suffice to say here that a properly operated septic tank will free the sewage of from 40 to 60 per cent. of its organic matter, with a great majority of the plants working nearer the lower figure than the higher. Of the organic matter in suspension, however, a much greater percentage is removable, depending upon the facilities for holding back the flocculent matter which ordinarily appears in the effluent. Owing to the greater ease of breaking up the nitrogenous organic matter, than the carbonaceous, there is a little larger reduction in the former than in the latter. As conditions are unfavorable for aerobic bacteria, ordinary plate cultures show an enormous reduction in the bacteria in the effluent. The organisms appearing on the effluent current plates are usually the facultative bacteria, those which may live either with or without air.

The object then of the operation of a septic tank is to obtain an effluent from which nearly all the mineral matter has been removed together with a large percentage of the organic matter, especially that in suspension, and in which the organic matter remaining is in a finely divided state, or better, in solution and in the proper condition for nitrification. Further, these results must be accomplished with a minimum production of sludge and without the causing of a nuisance. With the septic treatment of sewage as with all other treatments special study must be made of local conditions and the treatment modified in accordance with the facts as found. No set rule can be established, as to the proper size and method of construction, to which all septic tanks must conform.

The Mechanical Details

In regard to the mechanical details, but little need be said. Usually the tanks are made in more than one unit so that the treatment may not be entirely stopped for cleaning or repairs. Many of the later designs are provided with means by which the liquid sludge may be drawn off without disturbing the remaining contents of the tanks. They may be built of brick, stone, or concrete masonry, or of timber only. The covering, if any, may be masonry, or merely a frame roof to protect it from the weather. The inlet pipe should be so arranged that the sewage will quietly enter the tank without disturbing the surface scum or the sediment and pass through the basin in a broad sweep with no local currents or eddies. Baffle boards are at times placed in the tank so as to prevent these disturbances. The sewage should be taken from the tank below the scum and above the sludge, by means of a long narrow opening or a number of openings extending across the farther end of the reservoir.

In Ohio there are a number of septic tanks in use and more being installed every season. East Cleveland and Shelby have septic tanks in use, while Delaware, Kenton, Lakewood, and Mansfield expect to have this system in operation in the near future. Among the institutions, Trumbull County Infirmary and Fairmount Children's Home use regular septic tanks, but the large storage reservoirs at the following places have more or less septic action:—Ohio Hospital for Epileptics, Massillon State Hospital, Mansfield Reformatory, Montgomery County Infirmary, and Toledo State Hospital.

Following are the details of two septic tanks which have been installed at Lakewood, Ohio, which will serve to illustrate the principles of the system.

Lakewood hamlet is situated just west of Cleveland on the shore of Lake Erie and has an estimated population of about 4,500. The entire village is to be sewered on the separate system with one outfall sewer leading to the disposal site in the valley of Rocky River. The method of disposal decided upon by the engineers in the employ of the village, is the septic tank followed by treatment on cinder contact beds. There has been constructed for the present two septic tanks consisting of brick and concrete masonry basins, covered with a concrete and expanded metal roof. Each basin is 74 by 36 by 8½ feet deep, giving a capacity of 150,000 gallons, or 300,000 gallons for both. From the nature of the sewage of Lakewood it is believed that a 12-hour treatment will be sufficient so the present tanks will serve until the daily flow of sewage reaches about 600,000 gallons. For the present, it is thought likely that it will be necessary to admit a little rain water to the sewers so as to increase the flow to a working quantity for the tanks. As the system is now no close estimates could be made of the amount of sewage to be expected.

The tanks cost about $7,000 or a little more than $1.50 per capita of the village's population. The cinder contact beds cost about $18,000 or $4.00 per capita, making for the complete purification scheme a total per capita cost of $5.50. The sewage is automatically distributed to the contact beds and it is believed that the cost of operation will be very low.

THE SEPARATE SYSTEM OF SEWERAGE

More Expensive but More Efficient—Application of the Principle—Some of Its Advantages Disadvantages and Defects Described

*By J. Gust Richert**

THE combined system of sewerage consists of sewers that carry off rain water as well as sewage. The pipes of the separate system are intended for sewage and possibly for rain water falling on a part of the town, but, as a general rule, rain water is carried away to the nearest watercourse through open gutters or special pipes. In some towns this principle has been developed to such an extent that rain-water pipes have been laid down in all streets, with branches at all houses, each house having two pipes, one for sewage and the other for rain water. The combined system is the best, but also the most expensive, since its capacity must be equal to the greatest known quantity of rain, which often amounts to fifty times the amount of sewage. From motives of economy, therefore, the dimensions of the mains are often reduced by means of storm-water overflows, which, owing to heavy rain falls, allow part of the then greatly diluted sewage to flow into the nearest stream of water. The separate system, which is adopted in many towns, where the sewage must be pumped and purified, is from the sanitary point of view very effective, as the sewers are primarily intended for the removal of sewage. Its weak point is that rain water is treated as a pure and harmless water which is allowed to run into the very smallest stream or brook. In towns where there is much traffic in the streets the gutters are very far from clean, especially during the "first flush." Only after the yards have been well flushed may the rain water be considered harmless. Where the direct outlet of sewage into a stream is inadmissible the prohibition should be extended also to dirty rain water.

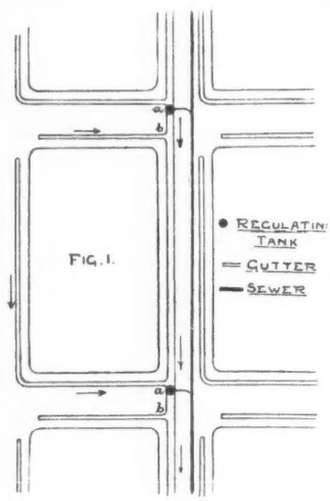


FIG. 1.

If, however, the sewerage were so arranged that the sewers also carried away the surface water running off after a normal rainfall, the rain-water outfalls would only be called into activity on exceptional occasions, and, in each case, only after the streets had been cleansed by the first flush. This alteration seems quite necessary, if a separate system is to satisfy the demands of hygiene. In many towns, it is true, rain water has been collected from part of the area, usually from roofs and yards. This, however, is of little avail, as the water running off from the streets and markets contains still more impurities. Moreover, the yards and the roofs belonging thereto form so considerable a portion of the rainfall area that the sewers are almost as large and expensive as in the combined system. In my opinion it would be far better to divide the town into very small districts, for example, of the size of an ordinary block of buildings, and in every such district place a regulating tank, through which a limited amount of rain water might be let into the sewers, while during heavier rainfalls the surplus would run off through the gutters or rain-water pipes.

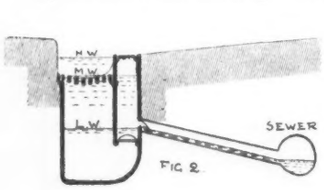


FIG. 2.

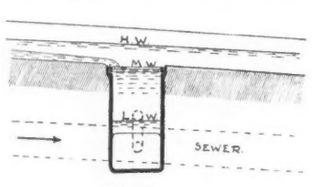


FIG. 3.

APPLICATION OF THE PRINCIPLE

The accompanying diagrams (Figs. 1, 2 and 3) show the application of the principle with a separate system, where the outlets of the rain water consists of open gutters. In every block at the lowest point of the gutter (Fig. 1) is a regulating tank, the outlet of which is proportionate to the quantity of water of a normal rainfall. So long as this quantity is not exceeded every drop of water passes away through the sewer, and only during violent and short rainfalls does the gutter, a b, across the street, become active. The low-water level, l w, is determined by the orifice of the outlet, the water level of the usual rainfalls, m w, by the bottom of the gutter, and the high-water level, h w, by the dimensions and inclination of the gutter. When rain begins to fall the water in the tank rises from l w to m w, while the discharge of the tank increases from o to r. This limit having been reached, the surface of the gutter water rises from m w to h w, while the discharge of the tank increases from r to R.

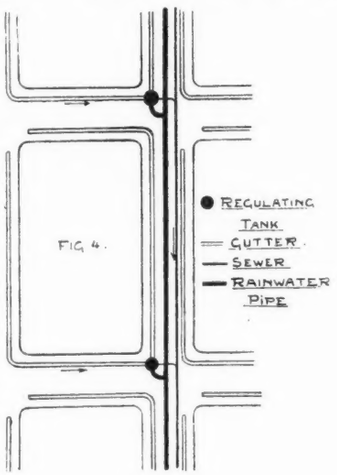


FIG. 4.

For instance, if all the rain water is to flow underground, so long as the rainfall is less than two millimetres an hour, and every block of buildings, with street surface belonging thereto, occupies an area of one hectare, the dimensions of the tank and sewer may be calculated as follows: The quantity of rain running into the sewer is considered as 60 per cent. of the rainfall, thus to 1, 2 mm. per hour or 3, 3 litres per second per hectare; this quantity must therefore by m w stream through the outlet of the tank. If the coefficient of the outfall be taken as 0.6, then according to a well-known formula

$$r = 0.6\,\pi\,\frac{d^2}{4}\sqrt{2\,gh} = 0.0033 \text{ m}^3, \text{ where}$$

d = diameter of the orifice,
h = head of water.
g = acceleration of gravity per second (9.80).
For h = 1 metre.
d = 0.04 metre, or 1½ in.
If the maximum depth of water in gutter is 0.5 metre, then
h = 1.5 metres, and

$$R = 0.6\,\pi\,\frac{0.04^2}{4}\sqrt{19.6 \times 1.5} = 0.004 \text{ m}^3, \text{ or 4 litres per second per hectare.}$$

If, finally, the sewer proper amounts to one litre per second per hectare, the capacity of the sewer must be arranged for five litres per second per hectare, while the gutters must be adapted for the rest of the quantity of rain, which is many times greater.

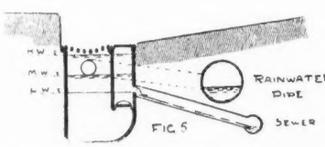


FIG. 5.

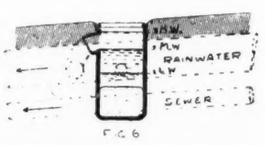
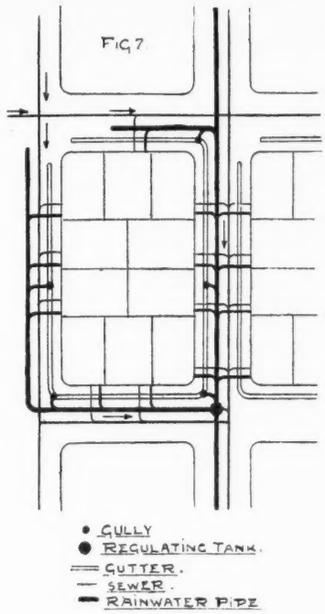


FIG. 6.

EASILY ADAPTED TO LOCAL CONDITIONS

This system may be adopted in towns where previously both sewage

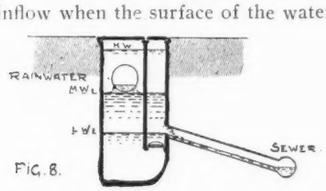
* Stockholm. Written for *The Surveyor*, London.

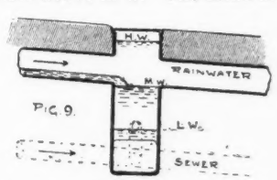


and rain water have flowed in open gutters, and where, from motives of economy, it is desirable to keep the gutters from carrying off storm water.

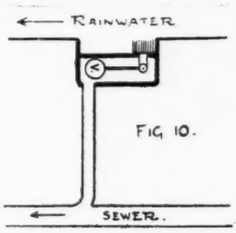
Figs. 4 and 6 show the arrangement of regulating tanks, where besides the sewers, pipes are laid down for carrying off rain water from the gutters. Each tank is supplied with two outlets, the one to the sewer, the other to the rain-water pipe. In this case the m w is decided by the level of the rain-water orifice and h w by the highest water level in the rain pipe. So long as the rain-water flow does not amount to r, all the water runs into the sewer, while after more violent rainfalls the surplus flows to the rain-water pipes. If the houses are provided with special rain-water branches the regulating tank is placed directly on the street pipe, with an overflow to the sewer, as shown in Figs. 7 to 9. As long as the quantity of rain water between two adjacent tanks is less than r all water runs to the sewer, but by storms the surplus flows to the rain-water outlet.

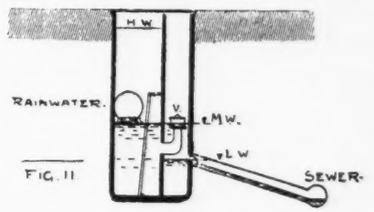
The difference in height between m w and h w may often be very considerable, especially if the rain-water outfall is carried into a tidal stream. This may possibly cause an unnecessary increase of R, and consequently of the dimensions of the sewer. To obviate this the tank should then be constructed as shown in Figs. 10 to 12— i. e., with two chambers, of which one is of constant level and consequently constant discharge. V is a floating valve which shuts off the inflow when the surface of the water rises above m w. The same arrangement can, of course, be made with the tanks as shown in Figs. 2 to 3 and 5 to 6.





The regulating tank can also be constructed in such a manner that the discharge to the sewer is gradually decreased and finally ceases altogether. This adaptation is shown in Fig. 13. The outlet is so constructed that a certain quantity of rain water, r, flows from the tank into the sewer when the water is at a certain level, u. At the commencement of rain, when the water is at a lower level, a larger

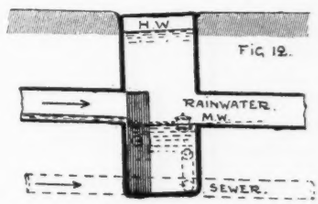


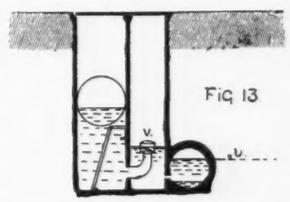


quantity flows in, but when the water rises to a maximum the inflow is reduced to o.

Some of Its Advantages

This system has the great sanitary advantage that all dirty rain water is treated as sewage, and that the rain-water outfalls do not come into action until the water is comparatively pure. As the capacity of the regulating tank is to a very small degree—and in the arrangement shown in Figs. 10 to 12 not at all—dependent on the level of the water in the gutter or rain-water pipe, absolute security is obtained as regards the possibility of the cellars and sewers being overflowed, which is never the case with a combined system, or a separate system where the sewers carry off the whole quantity of rain water





from one portion of the town area. The management and care of the regulating tanks is very simple. As a rule but one tank will be necesary for each block of buildings, and the grate, or float-valve, can easily be inspected and cleaned through the manhole.

The regulating tank shows a certain constructive resemblance with the storm-water overflow, but acts in quite a different manner. The overflow admits to the stream or river a mixture of rain water and sewage, which cannot be considered inoffensive, and the regulating tank only such rain water as has run off after the cleaning of the streets by the first flush. The overflow does not prevent the combined sewers from being overtaxed by the unlimited rush of storm water, whereas the regulating tank limits the inflow of the rainwater to a certain maximum and thereby renders absolutely impossible any flooding from the sewer. In short, the overflow acts as outlet for an incalculable quantity of rain water and sewage, and the regulating tank as an inlet for a carefully-calculated quantity of rain water.

From a hygienic point of view a combined system without any storm-water overflows must still be deemed the very best; next after this follows a separate system with regulated inlet of dirty rain water.

WASHINGTON'S MUNICIPAL LODGING HOUSE

The municipal lodging house of Washington, D. C., was organized in 1870, but was placed in its present condition in 1892. The house is open from six in the morning until ten o'clock at night. Meals are served at regular hours. No person under the influence of liquor will be admitted and all applicants must saw one-eighth of a cord of wood for his supper, bath, lodging and breakfast. No one can stay there longer than three days, and all meals consumed on Sunday must be worked for during the week. These are some of the rules that have been laid down by the Superintendent, L. B. Cutler, who has been in charge since 1895. Formerly the wood dealers would have their wood sawed at the lodging house free of charge, but Supt. Cutler has made contracts with the dealers so that he is able to turn in a comfortable sum every year. The men who stay at this house are treated kindly, for the Superintendent considers it better to restore their self-respect and reform their drinking habits rather than impress upon them the fact of their condition. The house accommodates fifty persons and every man must take a hot bath before retiring while his clothes are thoroughly fumigated during the night.

The Superintendent says there are two classes of inmates, hoboes and tramps, and he distinguishes them apart by the fact that hoboes are men who will work if they can, but are always on the move for more pleasant positions, while the tramp will not work unless he has to. In addition to this there are many good men who have sought employment at a distance and have been fortunate in securing it although they are good mechanics. Each man is given two square meals a day and this is cooked in the best manner and the materials are as good as can be purchased. No smoking, noise or profanity is allowed in the building, and the brief stay there of any man is certain to have a good effect upon his life.

PLAYGROUNDS OF SAN FRANCISCO

Moral as Well as Physical Training Given—Privileges Are Free to All—Some of the Good Results—First One Established by the California Club Four Years Ago

By W. H. Hutton

All thoughtful people to-day admit that a child's play is quite as important a part of his education as the child's study. In fact the hours of play afford a special advantage for teaching important

THE FUTURE CITIZENSHIP

truths that cannot be had in what is known as the school life of the child.

I believe that a casual study of the work going on in the public play ground will convince any one of the importance of this question. If the children are brought into proper contact with examples of right social relations, of the rights of each other, of the right to use the apparatus provided for the common good, and the right use of all their privileges, they are bound to grow up into better men and women.

In the Play Ground at Seventh and Harrison streets there are no special or privileged characters; rich and poor, Jew and Gentile, mix indiscriminately together, and thus, all its privileges being free, they are equally enjoyed by all. The good alone predominates, and as there is no smoking, swearing, or bullying allowed, the children are removed from the dangers and temptations incident to play in the public streets, and thus there is added security not only to the public morals, but to life and limb as well.

Symptoms of Awakened Pride

The good results of this mingling together are already apparent in the actions of many of the boys of this district. Boys that were careless in their manner of dress and speech, and in the habit of loafing the streets, are now to be seen with clean hands and faces, clothes brushed and shoes shined; in fact, they have become so improved that they have often risen to be "badge boys," in the grounds, an honor greatly sought.

San Francisco should have as many play grounds as we have school buildings, and each should be in charge of competent instructors, who not only know how to teach athletics, but can uplift the children by coming into personal contact with them.

What children need is fun, pure and simple, and for this purpose the Public Play Ground was fitted up. It is a public place, maintained by the tax payers of the city.

There is no charge for anything except the rides on the donkeys, and any child is entitled to all the privileges of the place.

The grounds are in charge of a picked corps of boys and girls, who have charge of different sections, and all disorderly conduct is immediately reported to the Superintendent.

Mutual Helpfulness Is Taught

The duty of the badge boy or girl is not simply to act as a monitor or policeman, but to help and encourage the others to enjoy themselves on the apparatus, ladders, "horses," swings, etc.

The leaders are promoted according to their ability and faithfulness, and they in turn have power to elect from their number, the president, vice-president and secretary of the play ground.

The grounds are equipped with a large twelve sided open air gymnasium or *gym* as the boys call it, 140 feet in circumference. In the center is a large 40-foot flag pole; to this frame and pole are attached rope ladders, climbing poles and ropes, four horizontal bars, trapezes, flying rings, chest bars, climbing peg poles, sixteen horizontal, vertical and slanting ladders, and in the open space are found a horse, buck, and two sets of parallel bars. The whole surface of the gym is covered with a thick coating of tan bark, so there is no danger of falling.

Dolls May Come, Too

There are also four large hand-ball courts, well bitumenized, two sets of traveling rings—one set for boys and one for girls—plenty of teeter-boards, spring boards, May poles, sand piles, and swings for children of all ages.

The girls have their own section, and have a small building where the children play with their dolls, called the "Doll's Lodge."

In the small boys' section, is a hoisting apparatus where the

HAVING THE TIME OF THEIR LIVES

small boys hoist up the sand by means of a windlass, and plenty of wheel-barrows and wagons are kept handy to haul away the material—in fact everything a child can wish is found within these fences.

Editors Note.—This article was written for the Merchants' Association Review, San Francisco, by W. H. Hutton, Superintendent of the Public Play Ground, and here republished by the courtesy of the Editor of the Review.

The play ground has the nucleus of a "Zoo" in a few rabbits, white rats and guinea-pigs—it is now waiting for some kind friends to donate some chipmunks, squirrels, monkeys, birds, etc., so if you know of any one having them to spare, induce them to send them along for the pleasure of the children.

The grounds are open on school days from 2:45 to 5:30 p. m., and on Saturdays, Sundays and holidays from 8 a. m. to 5:30 p. m.

How It Came into Being

The history of the play ground: its origin, tribulations, setbacks, temporary successes and failures, the struggles of the men and women who worked on behalf of the poor children of the over-crowded section of the city before final success was achieved, would make an interesting chapter.

To the California Club is due the credit of establishing the first children's play ground on the Pacific Coast. It was on a small lot on Bush street near Hyde, and was opened about four years ago. Miss Mary Lake, Mrs. Alexander Sharon, Mrs. Lovell White, and Miss George constituted the original committee. Mrs. Sharon had been east and had made a study of the play grounds, and returned filled with enthusiasm, and with a mass of useful information. Her suggestions and plans for a play ground in this city met encouragement in her club, and the first play ground was established. From its opening until it was abandoned, the grounds had been placed in charge of several men. For nearly one year and up to the time it was abandoned, the Superintendent and instructor of the new grounds was in charge. It was demonstrated beyond a doubt, that a new play ground properly equipped would be a success.

Perseverance Won at Last

The club renewed its efforts this time trying to establish one south of Market street in the thickly settled district. The Merchants' Association readily volunteered $1,000 toward the project, other commercial organizations promised to contribute generously. But it was found the suitable grounds could only be secured at a heavy rental, and could be maintained only at a large expense, while the contributions could only be relied on for the first cost, and the project had to be abandoned.

It was only a lull in the agitation soon to be resumed. Mrs. Arthur Cornwall, of the California Club, took up the thread where others had dropped it. She started upon a vigorous campaign, and was aided by Dr. Max Magnus, and others representing turn vereins of this city. Their earnest pleading with the Board of Supervisors resulted in the adoption of a resolution, passed unanimously, appropriating $12,000 to be applied in procuring and fitting up the present site for a play ground, the control to be placed with the Board of Education. Supervisors Brandenstein, Braunhart and D'Ancona were especially favorable and advocated the project. In the school board the project found another advocate in Director Mark, who had made a study of the matter and worked assiduously for its success.

MEETING OF AMERICAN ROAD MAKERS

Its Rapid Growth—Now International in Its Scope—Favors Brownlow Bill for Federal Support—President Roosevelt Invited to Be Its Guest

By Our Special Correspondent

The first annual meeting of the American Road Makers will be held at the Wayne Hotel, Detroit, Michigan, February 13th and 14th, 1903. Governor Bliss and both Houses of the Legislature have already accepted invitations to be present on that occasion. Invitations have been sent to President Roosevelt, the members of both houses of Congress, and the Governors of the various states to be in attendance and join in the discussion of a general plan for a united effort to improve the national highways. The bill recently introduced in the House of Representatives by Congressman Brownlow, of Tennessee, will also be discussed. Every state in the Union will be represented. It will undoubtedly be the greatest gathering of its kind ever held in this or any other country. It will be international in its scope, as representatives will be invited from both Mexico and Canada, as there have come requests from both localities to be included in the general scheme for road improvement as outlined by the executive committee of the American Road Makers.

Progress During the Year

The achievements of this youthful good roads organization have been most gratifying. It has successfully co-operated with various states in operating and organizing good roads departments or highway commissions. State Engineer Edward A. Bond, of New York, who is the first vice-president of the American Road Makers, reports as to the work accomplished in New York State, as follows: "There have been 193 miles of road completed, comprising seventy-two roads in twenty different counties. There are sixty-two miles of road, comprising forty-eight roads in eighteen different counties, in process of construction, thus making a grand total of 355 miles of highways completed or partially so. In addition to this, 338 miles of road, comprising ninety-nine roads in twenty-two different counties, have been surveyed and mapped, for which the Board of Supervisors of the respective counties has appropriated its half of the cost, estimated at $1,391,913. These county officials are now waiting for an equal appropriation from the state before proceeding with the construction.

"Up to the present time 466 miles of road have been surveyed, a portion of which is mapped and in the hands of the supervisors, and 848 miles of road have been petitioned for, which have not yet been surveyed or mapped. A grand total of 2,007 miles of road, in forty-three of the sixty-one counties of the state, have been petitioned for since the operation of the Highbee-Armstrong law. The various counties have petitioned for 1,752 miles of road thus far, for which the State has made no appropriation, and which, at $4,000 per mile, would require as the State's share, about $7,000,000." This gives a fair idea of the growth of public sentiment in favor of better highways in the Empire State, and speaks well for the energetic efforts of the American Road Makers.

Progress in Michigan

Equally gratifying results have been achieved in Massachusetts, Connecticut and New Jersey, the pioneer states in road improvement. Some progress is reported in Pennsylvania, and it is expected that some suitable legislation will be enacted at the next session of the Legislature providing for a better system of highway construction and maintenance than now exists in the Keystone State.

In Michigan there has been a most radical change in the work of road improvement, which, no doubt, has been due to the activity of the president of the American Road Makers, State Senator Horatio S. Earle. Under the magic touch of President Earle, order has come out of chaos, and systematic effort out of the hit or miss plan prevailing previous to the present organization. The concrete results thus far in Michigan have been the accumulation of funds in various counties aggregating over $500,000, for road improvement, the formation of a highway commission with President Earle as its chairman, and a carefully formulated plan to be presented to the present State Legislature for the creation of a State Department of Highways, the affairs of which will be administered by a competent engineer. This new department will be organized in a modern way and its affairs administered most effectively.

The organization has co-operated with the Department of Road Inquiries at Washington, in every possible way, lending its influence when practicable, to insure the success of the various good roads trains which have been run under the supervision of the Road Inquiry Department. It is but fair to state that the great success of the Road Inquiry Department has been due to the active work of its directors, the Hon. Martin Dodge and Mr. M. O. Eldridge, the former as a promoter of the good roads train efforts,

and the latter in charge of laboratory and experimental work. Each in his particular field has contributed very largely to the development of the good roads sentiment throughout the country. In this connection credit should be given to the promotion of good roads sentiment by the various automobile clubs, national, state, and civic, as well as the League of American Wheelmen. The cause has grown so popular that even the magazines, as well as the newspapers, have vied with each other in giving publicity to the various plans for road improvement.

The Brownlow Bill and Its Objects

Among the general results achieved in the fight of the American Road Makers for better highways, has been the introduction of the bill by Congressman Brownlow, of Tennessee, asking for an appropriation of $20,000,000, the sum to be expended under the direction of the Bureau of Public Roads. The bill provides that this Bureau be a part of the Department of Agriculture; also for a system of national, state, and local co-operation in the permanent improvement of public highways.

The object and purposes of this Bureau, according to the proposed bill, shall be to instruct, assist, and co-operate in the building and improvement of the public roads, at the discretion and under the direction of the Director of the Bureau, in such states, counties, parishes, townships, and districts in the United States, as shall be determined by the Director. The general policy of the Bureau shall be to bring about, so far as may be, a uniform system of taxation for road purposes and a uniform method of road construction, repair and maintenance throughout the United States, and to co-operate with any state, or political subdivision thereof, in the actual construction of permanent highways.

It is provided that half of the expense of the construction of any road shall be paid out of the funds of the Bureau, while the remaining half of the expense shall be borne by the state or political subdivision thereof making application for the Federal co-operation provided for in the bill.

What Is Thought of the Proposed Bill

In speaking of the Brownlow bill and its objects, President Earle recently said: "It is equitable for the town to assist in connecting the farms, districts and villages by inter-farm roads, for of them the town is made up. It is equitable for the county to assist in connecting the towns, villages, and cities by inter-town roads, for these divisions make up the county. It is equitable for the state to assist in connecting towns, cities and counties by inter-county roads, for the state is composed of counties. It is as equitable for the United States to assist in connecting the states by inter-state highways, or national thoroughfares, connecting every state capital with Washington.

"If each department in a great university depended upon a certain county for its support what would be the result? That the department which was supported by the county that had an assessed valuation of $500,000,000 would be grand, and such as any one would be proud of, but the department that depended on the county with a valuation of only $50,000 would be mighty bad. Consequently the student that was educated in the former university, could not fail to have better advantages—because of the greater funds at the disposal of the university—than in the latter. But no state university is run in any such way. It is supported by state aid and this fund is raised by taxing all property in the state, and each department is run on the same level, or standard, so that all departments of the university have equal advantages.

"So an inter-town road, a part of which is built by a rich town and a part by a poor town, must necessarily be good in one place and poor in another. As the states do not grow on the cities, but the cities do on the state, and represent great accumulations of wealth, and as any saving in transportation contributes to the wealth of the state and benefits every dollar's worth of property in the state, then every dollar's worth of property should share in the building of permanent inter-town roads in order that as much of the cost of transportation may be saved as possible.

"But there are large cities and large corporations which have not been developed by any one state, but by all of them. Then national aid for inter-state, or national highways offers to these beneficiaries the opportunity for paying something toward the development of national highways and a chance to reciprocate for favors already received."

State Engineer Bond, Vice-President of the American Road Makers, in commenting upon the Brownlow bill, remarked: "I can see where the enactment of such a law would be of great benefit to the whole country. However, I think the bill should be so amended that any state receiving government aid for good roads should first have either a state highway commission or a state engineer, under whose direction this money should be spent on plans and specifications agreed upon by said board of highway commission or state engineer and the director of the Bureau of Public Roads.

"I am personally in favor of a bill of similar import to the one referred to, but think slight modifications should be made."

Pushing the Work from All Sides

The American Road Makers have committed themselves to support every measure which is calculated to bring about a better system of public highways in the United States. To this end, it believes most heartily that the Federal government should be persuaded to give a larger appropriation for the support of the movement. As Senator Earle has put it: "No less money for rivers and harbors, but an equal amount for improving the highways throughout the country." The highways of the country have been neglected altogether too long. The public has believed in the improvement of rivers and harbors for many years and has so impressed itself upon Congress as to bring about the appropriation of millions of dollars annually for their continued improvement and maintenance. We believe this good work should not be stopped, but at the same time we have the conviction that a few millions should be expended for the betterment of a system of highways which should ultimately connect the various state capitals with the national capital. The rapid growth of public sentiment in favor of better roads, during the past five years, would seem to assure the realization of so desirable an achievement. The nations of the Old World are wiser in their day and generation than the New, because they are expending millions where we are expending hundreds of thousands of dollars for highway improvement, and yet their combined territory does not begin to equal that of the United States. Besides, most of them have been improving their roads for centuries while we have not devoted as many decades to a systematic effort for road improvement.

But there is a better time coming, as an evidence of which one has but to examine the work of the American Road Makers during the first year of its existence. Its influence has been felt from New England to California, and from the Lakes to the Gulf. And now comes a proposition from California to make an alliance with Mexico. The work in California has been largely organized and developed through the efforts of Miss Annie B. Picher, who is the Director of the Pasadena Exhibition Association, which has had a road exhibit in the Los Angeles Chamber of Commerce for some time. It is now proposed by the California contingent that the inter-capital-connecting highway plan be so incorporated with a similar scheme developed for Mexico that the highways shall converge at Washington, and also at the City of Mexico. Miss Picher writes that this scheme meets with more universal approval on the Pacific Slope because it is far more interesting than the Trans-Continental road, because it will include every state in the two Republics.

It is predicted by the most sanguine friends of this good roads movement that before another year shall have passed, the various provinces of Canada will be included in the general scheme. There has been some talk in this direction already, and it would not be at all surprising if a definite proposition were presented to the executive committee at its Detroit meeting.

PROFITS IN THE AMERICAN GAS FIELD

Evident Inflation of Stocks and Bonds Issued by Gas Companies—Reasons Why These Securities Do Not Give Fair Returns—An Interesting Story About the Situation in This Country

*By Alton D. Adams**

Gas companies in the United States do not receive a reasonable return on their investments, if the stocks and bonds issued represent the fair value of their plants. During the census year of 1900, the gross profits of the 862 private plants reported, represented by the excess of earnings over operating expenses, amounted to only 3.5 per cent. on the stocks and bonds of the companies owning these plants. These operating expenses include no items for depreciation. If the sum paid, as interest, on the bonds of these companies is deducted from the gross profits the remainder, or net profits, represent a possible dividend of only 2.7 per cent. on their capital stock. This stock, amounting to $376,035,803, has been widely distributed to investors who are naturally dissatisfied with its earnings. Among these dissatisfied investors, if newspaper reports are to be believed, is an ex-President of the United States. On this state of facts arises the question whether, on the one hand, stockholders are entitled to demand large dividends, or, on the other, whether gas consumers are already paying more than a fair return on the actual value of the plants.

Stock and Bond Valuation

In 1900, the sum of stocks and bonds representing the 862 private gas plants stood at $568,704,084, and the companies claimed assets in the business amounting to $505,265,014, or nearly the total for stocks and bonds. The bonds of gas companies were not reported in the census of 1890, so that the total increase of securities issued by these companies during the decade ending with 1900, cannot be stated. In this decade the capital stock of the companies received an addition of 63.7 per cent. and it is probable that their bonds were increased at a much greater rate, for the value claimed for gas assets in 1900, by the companies, was 2.18 times as great as the like value in 1890. The true ratio between the values assigned to private plants in these two years is somewhat greater than that just stated, because the value reported in 1890 included a few municipal plants. This increase in gas securities and in the value claimed for the plants is greater than the rise in the volume of gas sold during the same period.

Value as Compared with Gas Sold

In 1890, the value put upon gas assets amounted to $7.13 per thousand feet of gas sold, but in 1900, this value stood at $8.48 per thousand feet of gas, or 1.19 times the amount in the earlier year. It seems unreasonable that with the progress of the art the investment required in plants, per unit of gas yearly sold, should greatly increase; but, on the other hand, it might fairly be expected that the investment per thousand feet of gas would materially diminish. This view accords with the results in Massachusetts, where the gas companies had outstanding $4.32 in stocks and bonds per thousand feet of gas sold in 1890, but only $3.87 in stocks and bonds per thousand feet of gas sold in 1900. If the stocks and bonds of gas companies have been issued to an amount far beyond the fair value of their plants it is probable that these excessive issues began before 1890, so that this year cannot serve as an accurate basis of comparison for all the states.

Fifteen municipal gas plants, reported by the census of 1900, and located in nine states, claim assets amounting to only $3.57 per thousand feet of gas sold in that year. These municipal plants are comparatively small in capacity and they sold only .72 of one per cent. of the total sales of gas in that year.

It is well known that small gas plants cost more than large ones per unit of capacity, so that other things being equal the investment in private plants throughout the United States should be less than $3.57 per thousand feet of gas sold in the census year, instead of the $8.53 per thousand feet represented by the sum of stocks and bonds issued by the companies. It is not necessary, however, to rely on the municipal plants for figures to show the approximate investments required in gas plants generally per thousand feet of yearly capacity or sales, for such figures may be obtained from the private plants in Massachusetts.

The Situation in Massachusetts

Massachusetts stands fourth among the states in the annual volume of gas sold and is probably surpassed by none in the prosperity of her gas companies. Of all the states Massachusetts alone, through a commission, supervises and records the operations of all gas companies. For many years it has been a requirement of Massachusetts law that the stocks and bonds of gas companies be issued only for cash, or its equivalent in property. Since 1895, this provision has been made more stringent by the further requirement that stocks and bonds of gas companies be issued only when directly authorized by the commission. As already pointed out, the total stocks and bonds of the Massachusetts gas companies amounted to only $3.87 per thousand feet of gas sold in 1900, in spite of the fact that twenty-two of these companies supply electric light and have electric assets valued at more than three million dollars. The figures are derived from the reports of the gas commission which are based on the sworn reports of the several companies. It is notable that this figure of $3.87 for the private gas plants of Massachusetts is only a little above the figure of $3.57 per thousand feet of gas for the investment in all the fifteen municipal plants covered by the census report. In view of these figures it seems that $4 may be fairly taken as the approximate necessary investment in gas plants per thousand feet of gas yearly sold, on an average. If this conclusion is correct, the $8.48 in stocks and bonds issued by gas companies per thousand feet of gas sold in the census year represents more than double the fair value of the plants. As the $8.48 is only an average result for the private plants in all the states, it is desirable to consider the investments and profits of the companies in each state.

Stock and Bond Issues Compared with Gas Sales

The sum of stocks and bonds issued by gas companies in each state is divided by the number representing the thousands of cubic feet of gas which these companies sold during the census year, giving the stocks and bonds per thousand cubic feet of gas. From these operations it appears that great diversity exists in the ratio of stock and bond issues to gas sales in the several states. Thus, in Delaware the gas companies were able to sell one thousand feet of gas during the year for each $3.61 of securities issued, while in Nevada the companies had outstanding stocks and bonds to the amount of $49.85 for each one thousand feet of gas sold. Next in order as to high ratios between securities issued and gas outputs come Oregon, with $30.85; Nebraska, with $20.08; Louisiana, with $19.94, and Alabama, with $18.79 in the stocks and bonds of its gas companies for each thousand feet of gas sold in the census year.

In the great state of California, eighth in the Union as to the volume of gas consumed, the outstanding stocks and bonds of the companies amounted to $15.81 for each thousand feet of gas sold. Gas companies in Wisconsin sold less than three-fourths as much gas as those in California, but the stock and bond issues of companies in the former state represented only $3.73 per thousand feet sold. In New York, more than four times as much gas was sold as in Massachusetts, yet the stocks and bonds of companies in the former state amounted to $8.31, and in the latter to only $3.98 per thousand feet of gas according to the census report.

* Copyright, 1903, by Alton D. Adams. (All rights reserved.)

Some Interesting Contrasts

It is hardly to be presumed that the price of gas equipments is higher in Michigan than in the District of Columbia, in Minnesota than in Wisconsin, in Nebraska than in Colorado, in Indiana than in Ohio, in New Jersey than in New Hampshire, or in New York than in Massachusetts. Neither is it probable that more gas machinery, holders and pipes are necessary to make and distribute one thousand feet of gas yearly in one group of states than in another with a similar proportion of large and small plants. If these two propositions are approximately correct, and this is all that is claimed for them, there seems to be no escape from the conclusion that in many states the stocks and bonds of gas companies have been issued to amounts far in excess of the fair values of their plants. This view is confirmed by the ratios between the value of assets and the amounts of gas sold by the municipal plants in the census year.

Municipal vs. Corporation Values

Thus, in Ohio, the assets of the municipal plants were only $3.59 per thousand feet of gas sold, while the stocks and bonds of the gas companies amounted to $7.04 per thousand feet of gas. Again, in Virginia the assets of all the municipal plants amounted to $3.36 per thousand feet of gas sold and the outstanding stocks and bonds of the companies represented $10.48 for each like amount of gas. In West Virginia the municipal plants were able to supply one thousand feet of gas for each $2.23 invested in their systems, but the private plants had outstanding in stocks and bonds $9.49 for every thousand feet of gas which they sold. Only one state, Massachusetts, shows an investment in municipal plants larger than the sum of stocks and bonds of the companies per thousand feet of gas sold during the census year. In this case the census figures indicate that the municipal plants had nominal assets of $8.43 corresponding to each thousand feet of gas sold, while the issues of stocks and bonds by the gas companies amounted to $3.98 per thousand feet of gas. These figures are readily explained. As to the private plants, Massachusetts law has limited the issues of stocks and bonds as already pointed out. As to the three municipal gas plants, a law unique among the legislation of the States has forced their purchase from private corporations by the towns in which they are located, at prices far beyond their fair, structural value, as has been fully demonstrated elsewhere. Having been purchased at an inflated valuation, this valuation has evidently been used as the basis of the statement of assets for the three municipal gas plants of Massachusetts in the census report.

Inflated Values of Stocks and Bonds

In order to indicate approximately the extent to which the stocks and bonds of gas companies have been issued in excess of their assets, the sum of these stocks and bonds in each state per thousand feet of gas sold during the census year has been divided by four. This operation shows how many times the assets of the gas companies are represented by their stocks and bonds, because, as shown above, four dollars is a fair average value to put on a gas system for each one thousand feet of gas yearly sold. From these operations it appears that in only four cases, that of Delaware, District of Columbia, Massachusetts and Wisconsin, are the stocks and bonds of gas companies less than the probable value of their assets. In each of six states the issues of stocks and bonds by gas companies are between one and two times as great as the probable value of their assets. Stocks and bonds are between two and three times the approximate values of the plants of gas companies in each of fifteen states. In each of two states and, also, in a group composed of the six states and territories not otherwise reported, the gas companies have issued stocks and bonds to an amount between four and five times the probable value of their plants. Stocks and bonds in each of ten states represent three to four times the probable value of the assets of the gas companies. In Nebraska, the stocks and bonds of gas companies have a par value five times the probable investment in their plants. Gas companies in Oregon have issued stocks and bonds to a total that is 7.7 times the amount of their probable assets. Nevada leads in the expansion of gas securities with a total 12.4 times as great as the probable assets of the companies by which they were issued.

Ill Effects of Excessive Bond Issues

Whatever may have been the objects of those, who have issued these inflated gas securities, some effects of these issues are not hard to determine. One effect has been a fraud on investors in as much as they have been induced to purchase securities at prices far beyond the value or earning capacity of the property they represent. Another effect has been to conceal the relation between the profits and actual investments of gas companies and thus invite attack even where profits have been small. A third effect has been to cover up excessive profits and thus continue in force unreasonable prices.

These effects may be seen in the ratios of net profits to capital stocks, and of gross profits to probable investments. As a rule the ratio of net profits to the capital stocks of gas companies has been small. In three states the net profits of gas companies amounted to less than 1 per cent. on their capital stocks. Gas companies in two states had profits of between 1 and 2 per cent. on stocks, after operating expenses and the interest on bonds were paid. Profits on stocks ranging between 2 and 3 per cent. were earned by the gas companies in each of eight states. In six states gas stocks earned as net profit 3 to 4 per cent., and in four states 4 to 5 per cent. on their face values. Another eight states afforded gas companies 5 to 6 per cent., while four states rewarded these companies with 6 to 7 per cent. on their stocks, as net profits.

Virginia allowed gas companies to earn net profits amounting to 8.8 per cent. on their stocks. In Massachusetts the net profits on gas stocks were 10.5 per cent. Wisconsin paid gas stocks a net profit of 12 per cent. West Virginia rewarded gas companies with net profits amounting to 14 per cent. on their stocks. In the District of Columbia gas stocks earned a net profit of 16 per cent. Colorado led all the states by paying the gas companies a net profit of 18.3 per cent. on their stocks in addition to all expenses of operation and the interest on their bonds. In the five remaining states and one territory considered as a unit the sum of operating expenses and interest charges exceeded the gross earnings of the gas companies by an amount equal to nearly one-fifth of one per cent. on their stocks.

The Result of a Ruinous Policy

From the foregoing it appears that in more than one-half of the states the net profits of gas companies ranged from actual loss to less than 4 per cent. on their stocks during the census year. The states just mentioned include much the greater part of all gas stocks issued in the United States. In the state of New York alone the gas stocks amounted to the par value of $117,030,516, or nearly one-third of the issue for the entire country, and the net profits earned on these New York stocks was only 1.9 per cent. Moreover, in all the states depreciation operates to reduce the apparent net profits as here stated.

This is not an encouraging showing for investors in gas securities. It can hardly be doubted that a great part of the stocks above mentioned have been purchased by the body of comparatively small holders on the representation of earning capacities much beyond those actually attained.

Large Profits on Real Values

Though net profits on the great body of gas stocks have been very small, it by no means follows that the ratio of gross profits to the fair structural value of gas plants has not been large. To determine the approximate percentages of gross profits to actual investments in gas plants, the probable investment in each state is estimated on the basis of $4 for each thousand feet of gas sold during the census year. The gross profits, or difference between the total earnings and operating expenses, of gas companies in each state is then divided by the estimated value of their plants.

In only three states was the ratio of net earnings to the probable investments in gas systems less than 6 per cent. Gas companies in fourteen states secured as net earnings between 6 and 10 per cent. on their probable investments. In eighteen other states the net earnings of gas companies amounted to between 10 and 17 per cent. of their probable investments, during the census year.

Texas permitted its gas companies to earn above all expenses a sum representing 19.7 per cent. on their probable investment, though the ratio of net earnings to the stocks and bonds issued was only 5.4 per cent. Net earnings of the Virginia companies formed a percentage of only 7.9 on the sum of their stocks and bonds, but the percentage rose to 20.6 as to the probable investment. In relation to the sum of their stocks and bonds the gas companies of West Virginia secured net earnings of 12.8 per cent., but these same net earn-

ings represent 30.3 per cent. of the probable investment in their systems. The income of gas companies in Louisiana exceeded their expenses by an amount representing only 5 per cent. on the sum of their stocks and bonds, but these net earnings amounted to 24.9 per cent. of the probable value of their plants. In Oregon the net earnings of the gas systems amounted to 3.1 per cent. of their stocks and bonds, but to 23.9 per cent. of their probable, structural value. Compared with the issues of stocks and bonds the net earnings of gas systems in Nevada were only 2.3 per cent., but these same earnings represented 32.3 per cent. of the probable investment in these systems.

However unreasonable the charges made for gas in the various states may be, the excessive issues of stocks and bonds are well adapted to cover up the facts. No doubt the approximate value of $4 selected for the assets of the companies per one thousand feet of gas sold during the census year may involve a material percentage of error in some cases. In some states, where the average production of gas per plant was comparatively small, the allowance of $4 for investment per thousand feet of gas sold may be too small. In other states, like New York, Illinois and Pennsylvania, where the average production of gas per plant is very large, it is quite certain that the approximate investments above computed are too large, and the corresponding rate of net profit below that actually obtained.

PRIVATE PLANTS

Gas Companies.	Stocks and bonds per 1,000 ft. of gas.	Ratio of stocks and bonds to investment.	Per cent. net profits to stocks.	Per cent. gross profits to stocks and bonds.	Per cent. gross profits to investment.
Alabama	$18.79	4.7	0.9	2.8	13.1
Arizona	9.25	2.3	1.1	1.0	2.3
Arkansas	12.22	3.1	5.7	4.6	14.0
California	15.81	3.9	3.6	3.5	13.8
Colorado	5.62	1.4	20.4	12.0	16.8
Connecticut	7.02	1.7	5.5	5.1	8.9
Delaware	3.61	0.9	5.7	11.0	9.9
Dist. Columbia	3.11	0.8	16.0	14.0	10.0
Florida	11.19	2.8	2.9	3.6	10.0
Georgia	10.25	2.6	4.1	3.9	9.9
Illinois	8.42	2.1	3.9	4.6	9.6
Indiana	10.85	2.7	2.4	4.0	10.8
Iowa	8.92	2.2	3.0	3.7	8.2
Kansas	10.26	2.6	5.8	5.7	14.5
Kentucky	12.88	3.2	2.5	2.9	9.3
Louisiana	19.94	4.98	5.1	5.0	24.9
Maine	8.75	2.2	6.4	5.8	12.6
Maryland	12.78	3.2	3.8	4.5	14.3
Massachusetts	3.98	0.99	10.5	9.9	9.6
Michigan	13.20	3.3	2.0	2.4	7.9
Minnesota	11.66	2.9	3.0	4.7	13.6
Mississippi	12.09	3.0	6.4	5.0	15.1
Missouri	12.35	3.1	3.1	4.0	12.3
Nebraska	20.08	5.0	0.90	2.2	11.0
Nevada	49.85	12.4	2.3	2.6	32.3
New Hampshire	5.95	1.5	4.4	4.3	6.3
New Jersey	14.16	3.5	2.3	2.4	8.5
New York	8.31	2.1	1.7	2.7	5.5
North Carolina	16.83	4.2	2.1	2.8	11.7
Ohio	7.04	1.5	6.4	6.2	9.3
Oregon	30.85	7.7	0.45	3.1	23.9
Pennsylvania	6.28	1.6	2.1	2.9	4.5
Rhode Island	5.36	1.3	5.1	5.1	6.8
South Carolina	9.69	2.4	4.9	4.7	11.3
Tennessee	11.01	2.7	6.6	6.1	16.7
Texas	14.63	3.6	5.2	5.4	19.7
Vermont	11.50	2.9	5.5	5.4	15.5
Virginia	10.48	2.6	8.8	7.9	20.6
Washington	12.84	3.2	4.8	5.0	16.0
West Virginia	9.49	2.4	14.0	12.8	30.3
Wisconsin	3.73	0.93	12.0	10.2	9.4
Other States	16.98	4.2	*0.001	2.3	9.7

* Loss.

MUNICIPAL PLANTS

State.	Investment per 1,000 ft. gas.	State.	Investment per 1,000 ft. gas.
Kentucky	$ 3.14	Nebraska	$ 1.77
Massachusetts	8.43	Ohio	3.59
Michigan	8.39	Virginia	3.36
Minnesota	6.43	West Virginia	2.23
Missouri	1.36		

NEW CODE FOR VIRGINIAN CITIES

THE constitution that was passed recently for the State of Virginia contains general provisions regulating the cities and towns of that state. Hereafter all incorporated communities having a population of 5,000 and more will be known as cities, and all those with less population, towns. This provision, however, will not affect such places as already hold a charter. Each city which has a court in which deeds are admitted to record, shall elect a clerk of the court for a term of eight years. Every city in which there is a separate circuit court, must elect, every four years, an Attorney for the commonwealth. There shall be elected or appointed, for a term of four years, one Commissioner of Revenue, and if he be elected by the people, shall be inelligible for re-election for a second succeeding term. Each city is to elect a City Treasurer for a term of four years, who shall be ineligible for more than two consecutive terms. There shall be a City Sergeant to serve for four years and a Mayor to serve four years.

The Mayor shall have the power to suspend officers and members of the fire and police departments, and to remove such for misconduct in office, with the approval of the General Assembly. In every city there shall be a Council, composed of two branches, having a different number of members to be elected by the voters of the city; but in cities under 10,000 population, the General Assembly may permit the Council to consist of one branch. During his term of office, or for one year thereafter, no councilman shall be eligible to any office to be filled by the Council either by election or appointment. The Mayors and Councils of cities are to be elected on the second Tuesday in June, and their terms of office will begin on the first of September succeeding. All other elected officers are to be chosen on the Tuesday after the first Monday in November, their terms of office to begin on the first of January following.

It shall require a three-quarter vote of all the elected members of the Council to dispose of the rights of any city or town regarding its water front, lands, streets, etc. No franchise of any kind for the use of public property shall be granted for a longer period than thirty years. Before granting any such franchise, the municipality shall, after due advertisement, receive bids therefor publicly. After such grant is made and the term of years over, the plant, as well as the property of the grantee, in any street or other public place of the city, shall, without compensation to the grantee, or upon payment of a fair valuation therefor, become the property of said city or town, but no payment shall be made by reason of the value of the franchise. It is provided that no city or town shall issue bonds exceeding 18 per cent. of the assessed value of the real estate subject to taxation. This is in force except where previously some special authorization has been made by the Legislature, permitting a town to issue a greater percentage of bonds.

MUNICIPAL JOURNAL AND ENGINEER

Published Monthly by
THE MUNICIPAL JOURNAL PUBLISHING COMPANY,
253 Broadway, New York

WILLIAM S. CRANDALL, - - - - - - - MANAGING EDITOR
WEBSTER WAGNER, - - - - - - - - - ASSISTANT EDITOR
EMIL KUICHLING, C. E. - - - - - - - - ENGINEERING EDITOR

JOHN B. BENNETT, - - - - - - - - BUSINESS MANAGER
E. T. WHITE, - - - - - - - - ADVERTISING REPRESENTATIVE

TERMS OF SUBSCRIPTION
(Payable in Advance)

United States and Canada	$3.00 per year
Foreign Countries	4.00 "
Single Copies, each	.25

Special rates given for clubs of ten or more

Make all checks payable to The Municipal Journal Publishing Company

Entered at the New York Post Office as second class matter

NEW YORK, JANUARY, 1903

Disease from Crowded Street Cars.

THE menace to the public health from the unsanitary condition of the street cars in our large cities is a subject that impresses every physician and student of hygiene with its vital importance. Theoretically, the trolley car is a sanitary improvement over the public conveyance of the former day, but practically it is an invention of doubtful hygienic value. If we name in its favor, greater size, better heating and lighting facilities and higher speed, we must also take into account the fact that it is not well adapted to carrying the great number of people who ride upon it. Under present conditions, greater size does not insure greater convenience; in the "rush" hours of night and morning it means greater discomfort. Cars with a seating capacity of from twenty to thirty people often carry from sixty to ninety passengers. The sanitary evils of overcrowding are not speculative. From the time of Sedgwick and Farr to the present day there has been a great stream of statistical and analytical evidence to prove that persons who breathe poor air and occupy crowded quarters furnish high death rates.

The physiological effects of poor ventilation are well known. Air vitiated by the lungs is low in oxygen, high in carbonic acid and high in organic matter. Want of a sufficiency of oxygen, combined with the presence of products of respiration in the air, causes a reduction of heart action, increases in the rate of respiration, tendency toward headache, loss of appetite, reduction of vitality, nervous exhaustion, and in severe cases or in delicate organizations, nausea may be an immediate result of breathing foul air. Many who have traveled in overcrowded street cars are familiar with some of these effects and are aware of their injurious nature.

Poor ventilation causes the naturally vigorous condition of the tissues of the air-passages of the nose and throat, which normally have the power of rejecting or destroying dangerous bacteria, to become impaired and the entrance of the organisms which are the cause of bronchial and pulmonary disease is greatly favored. The part played by human beings in gathering and giving off bacteria in the cars should not be forgotten. The number of bacteria inhaled by a human being under ordinary circumstances may reach many thousands during one hour's tranquil breathing. Bacteria are freely given off in particles of moisture by persons in the act of speaking, sneezing or coughing. To those who have ridden in the street cars of New York, for example, during "rush" hours in winter, the fact that they are insufficiently ventilated needs no demonstration. The public appreciates that the musty odor noticeable in poorly ventilated street cars indicates that there are waste matters in the atmosphere which should have been promptly gotten rid of. Now, an average adult takes into his lungs 396 cubic inches of air per minute and gives off the same amount of vitiated air, which must be greatly diluted before it is suitable for further respiration. The measure of this necessary dilution is very easily understood, for we know that, while fresh air contains about three parts of carbonic acid and air which has been passed through the lungs 441 parts of carbonic acid per ten thousand volumes, the air of inclosed spaces becomes close when the carbonic acid exceeds about five parts per ten thousand. From these data it is found that something like 50 cubic fet of fresh air should be admitted to each car every minute per person.

It is clear that no such allowance of fresh air is supplied to passengers on any closed cars when they are running beyond their seating capacity. Such ventilation as occurs takes place irregularly by the opening and closing of the doors for the entrance or exit of passengers, or through primitive transoms and not by carefully regulated ventilators. The writer has found the air of these cars to contain as much as 26.2 parts of carbonic acid gas. Repeated counts of trolley cars in New York in cold weather have shown that about sixty per cent. had all their transoms closed. The insufficient warming of street cars in winter accounts, in part, for the attempt made to keep them entirely shut up. Want of a sufficiency of warmth is a prevalent source of complaint and a danger to health. Ventilation on the elevated roads is generally inferior to that on surface lines, because of the greater size of the cars and smaller proportion of time during which the doors are opened and the people are stirring about. Carbonic acid gas in the cars of the New York elevated roads has been found by the writer to run as high as 31.2 parts.

That many species of bacteria exist in the street atmosphere of cities has been frequently demonstrated by analysis, but examination of the mats used on the floors of the cars have shown that fibers one and a half inches long may hold three or four million bacteria. The origin of many of these disease germs, which occur in our street cars, can be understood by anybody who has noticed the universal and disgusting habit of spitting. The steps and platforms with their disgusting accumulations of sand, and the cocoa mats of the elevated roads and the gratings on the floors of the surface cars are favorite places for those who indulge in this dangerous habit. The findings of bacteriology leave no doubt as to the fate of a large part of the expectorated matter. It becomes dry and is pulverized under foot and is finally distributed through the air with dust. How far the spitting habit common in street cars is responsible for the eight thousand deaths from consumption of the lungs which occur in New York every year can safely be left to the reader's imagination.

But tuberculosis is not the only disease which is probably communicated in the street cars. From the facts at present known concerning the etiology of other infectious diseases, it can hardly be doubted that the infective poisons of scarlet fever, measles, influenza, diphtheria and pneumonia, not to say smallpox, are spread from person to person through the impure air and close personal contact which occur in the cars.

Is there any remedy for the sanitary evils of street cars? There are several. In the first place the power of the community to make laws for public safety should be utilized, and for this purpose it is needful that the necessity for such ordinances should be appreciated. The principal objects toward which, as the writer believes, laws intended to improve the sanitary condition of street cars should be directed, are a reduction of overcrowding, the prevention of spitting, and the proper ventilation, and warming of the cars. If overcrowding can be prevented, the problems of ventilation and warming can probably be solved, but not otherwise. The remedies available for overcrowding lie in providing more cars to carry the people and in restricting the number of passengers carried per car. It is not possible to discuss this problem within present restrictive limits, but it may be said that a judicious application of both remedies is the solution to which the writer's study of this problem points.

The prevention of spitting is the subject of greater consequence in the sanitary improvement of street cars. Until time develops a popular sentiment which will recognize expectoration to be a moral as well as a legal crime, the most practical remedy for the nuisance

seems to be to hold the transportation companies accountable for the condition of the cars. That the companies would be able to attend to this matter without undue hardship is evidenced by the fact that various rules for the safety of passengers are already enforced, for example, passengers are not allowed to ride on the steps of open cars in summer and generally not on the front platforms at any time.

GEORGE A. SOPER.

Corrections in Water Table

WE have received many complimentary letters concerning the "water works data of cities of 25,000 population or more," which was published as a supplement to our December number, and compiled by Mr. Dudley E. Waters, Ex-President of the Board of Public Works, Grand Rapids, Mich.

In the compilation of such a table there is abundant opportunity for error, and it is only surprising that so few were made. Not all of them were chargeable to Mr. Waters, as it is only too evident that some of them are "typographical errors."

Mr. Edmund Mather, President of the Board of Commissioners of the Water and Lighting Department of the city of Harrisburg, Pa., writes, "I have been too busy since your letter with enclosure was received, and have but barely time to notice an error in the percentage of our taps metered. We meter several taps with one meter. In some cases a whole row of houses if owned by one person or company. In one instance a firm has forty-eight houses all on one meter. This table simply says that we have 4,622 meters and 12,500 taps, therefore the percentage of meters to taps is .3697. It would be so if we only metered one tap with one meter. The fact is, that we have about 66 per cent. of our taps metered.

"If you will refer to the first page of my report for 1901, you will find an explanation of our large per capita consumption. The total pumpage was 3,200,660,300 gallons, an average of 8,767,288 gallons per day, a daily per capita of 153 gallons. It is estimated that about eighty-three gallons per day per capita were used for domestic purposes, and seventy for elevators, motors, fountains, flushing sewers, blowing mud out of street mains, fire, manufacturing, and other purposes. This should be carefully noted because there are plants that furnish very little water for manufacturing purposes and but few, any for hydraulic elevators. Last month (November) two of our large corporations used for manufacturing purposes nearly ninety millions. It is absurd to charge this to domestic purposes."

E. F. Frailey, Superintendent of Water Works, Lancaster, Pa., writes that the statement in regard to Lancaster is correct, excepting the stand pipe, which only has a capacity of 11,051 gallons.

W. C. Hawley, General Superintendent of the Pennsylvania Water Company, of Atlantic City, N. J., corrects the following errors: "In the first place it states concerning the supply 'drive and artesian wells'; whereas, in addition to driven and artesian wells, Atlantic City gets about one-half of its supply from Absecon Creek. The daily capacity is 10,850,000 gallons, which is at least 25 per cent. more than has ever been pumped, or can possibly be pumped with the present supply; whereas, if the figures given are meant to indicate total capacity of pumping machinery, without regard to quantity of supply, they should be 16,250,000 gallons.

"The pumpage, per capita, is given as 106 gallons. Had Mr. Waters referred to the report of the Water Department on page 30 (6th annual report) he would have found that the estimated average daily consumption per capita in summer is about thirty-five gallons and the same for the balance of the year is seventy-five gallons. In making his figures Mr. Waters has evidently overlooked the fact that 32,000, as stated, is only resident population; whereas, there are always from 1,000 to 5,000 visitors in town, and at times the population is swelled to over a quarter of a million."

The source of supply of the Atlanta, Ga., water works, is the Chattahoochee River instead of the Callahochee.

The source of supply of the Providence, R. I., water works is the Pawtuxet River instead of the Pawtucket River, and the annual cost of fuel is $13,506.55 instead of $112,903.54.

EDITORIAL COMMENT

Mr. C. E. McDowell, the author of "Municipal Condition in Havana," appearing in our December issue, writes: "I inadvertently gave credit to the Betts Publishing Company for the loan of the cuts used in my article, when credit should have been given to the Riggs Publishing Company."

The sixth annual convention of the League of Ohio Municipalities will be held in the city of Hamilton, Ohio, on February 10th, 11th and 12th. The general topic for discussion will be the new municipal code which was passed at the special session of the State legislature last summer, and which is to go into effect the first of May next.

The seventeenth annual convention of the National Brick Manufacturers' Association and the American Ceramic Society will be held at Boson February 2nd to 14th. City officials living in the vicinity of Boston will find it to their profit to secure a programme of the brick makers' meeting, particularly, so that they may arrange to be present when discussions on paving brick take place. For further particulars address Theodore A. Randall, Secretary, Indianapolis, Ind.

The New England Water Works Association will hold its annual meeting at the Hotel Brunswick, Copley Square, Boston, on Wednesday, January 14th. At ten o'clock the rooms in Tremont Temple will be opened for the use of the members, and at eleven thirty the executive committee will meet. Luncheon will be served at the Hotel Brunswick, for which tickets can be secured at one dollar and fifty cents. Besides the discussion of important questions relative to the construction and administration of water works affairs, the annual reports of the officers will be received, and new officers will be chosen for the ensuing year.

"The worm has turned." The long suffering public, which, for many years, has put up with the inadequate and shameful service of the various transportation companies of New York City, with only now and then an expressed groan, has finally shown spirit enough to demand something better. The Merchants' Association of Manhattan, and the Manufacturers' Association of Brooklyn, have been the leaders in the fight, and have succeeded in getting a hearing before the State Railroad Commission. Since receiving the first batch of testimony, the Commission has decided to take up the work of investigation itself, but in the meantime the local associations will not relax any of their efforts toward securing permanent relief. We believe that any move on the part of the various transportation companies to dodge the issue will be futile.

The Municipal Art Society of Baltimore, is endeavoring to secure the appointment of a public commission, to which the problem of street paving can be referred. The question is deemed a vital one to the "Monument City," as the numerous defective pavements are considered an impediment to the growth of the city. The purpose of the society is to, first, gather all possible information on the subject, so that it may be placed before the city authorities in connection with the proposition to enact a law for the establishment of a commission which will be empowered to consider the whole question of street construction and maintenance. If the movement results in the appointment of a non-partisan commission, which is desired, whose personnel will include only practical men, the outcome is likely to prove satisfactory. We would suggest that a woman who knows something about the general subject of municipal affairs, be made a member of the commission. Many women in our great cities are coming to take an active part in the conduct of the city, and with notable success in solving certain phases of the problem.

LETTERS TO THE EDITOR

The Grooved Rail Preferable

KEWANEE, Ill., Nov. 25, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

As I am a subscriber to the "JOURNAL," I want to ask what rail is the best for street railway in paved streets, and streets that are not paved. As we are about to put in a street railway, we would like to have the opinion of those who have had experience.

S. J. SHARP, *Alderman.*

Where a street is improved with some permanent form of pavement, according to the consensus of opinion of both city engineers and paving contractors, the grooved girder rail is far preferable to any other. In our opinion, what is known as the "T" rail should never be laid on a street with a permanent pavement, for it is a nuisance in many ways. The T rail is generally used where streets are not paved.—[EDITOR.

Information about Charter Building

TRENTON, N. J., Dec. 4, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

A commission has been appointed by the Mayor of Trenton to prepare a new municipal charter. As a member of that commission, I have been asked to secure all the available information concerning charter reforms in other cities. Knowing your acquaintance with municipal themes, I write to ask if you can place me in touch with men and literature which will aid us in our work. Any service you may be able to render us will be heartily appreciated.

ALFRED W. WISHART, *Editor.*

By referring to the MUNICIPAL JOURNAL AND ENGINEER for March, 1902, page 118, under the caption, "How to Build City Charters," you will find a list of books dealing with the question of city charters. Correspondence with Dr. Milo Roy Maltbie, Secretary, Art Commission, City Hall, New York City, and the Hon. Clinton Rogers Woodruff, Secretary, National Municipal League, North American Building, Philadelphia, Pa., will be sure to elicit other valuable information.—[EDITOR.

Municipal Ownership Not Always Desirable

FOSTORIA, O., Dec. 4, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

Do you find it profitable for cities to own their own electric light plant? J. H. TWINING, *Superintendent Water Works.*

That depends on several considerations, the most important of which are those pertaining to the locality. Some cities make a complete failure while others are tolerably successful. We know of no instance, however, where a municipal electric light plant is managed as economically under public as under private ownership. Granting this statement to be a fact, it does not necessarily form a convincing argument against public ownership, for the reason that in almost every instance of public ownership, the citizens of the community receive greater benefits from a public administered plant than from a private plant. For instance, despite the bad management under public ownership, commercial lights are furnished at a lower rate, and arc street lighting costs the town less, while the revenues from the plant, as a rule, take care of the interest, sinking fund, depreciation and repairs. There have been, and are, some notable exceptions to this rule. We do not advocate municipal ownership indiscriminately, but we do hold the opinion, on general principles, that it would be better for all cities either to own and operate, or control, all public utilities as rapidly as the local conditions would permit.

If you have any decided views on this subject we would be pleased to give you space, to any reasonable extent, to set them forth.—[EDITOR.

Central Steam and Water Heating Plants

FORT WAYNE, Ind., Dec. 11, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

Can you furnish me names of cities that have granted franchises, or that are operating steam or water heating plants? If you will kindly do so I will be under many obligations to you.

HENRY C. BERGHOFF, *Mayor.*

The following is a list of cities in the United States which have either independent steam or water heating plants, or one in combination with some other public utility. By addressing the mayor in any of the cities named you will doubtless be able to secure the special information desired:

Auburn, N. Y.; Allentown, Pa.; Atlanta, Ga.; Alton, Ill.; Bloomington, Ill.; Burlington, Ia.; Cumberland, Md.; Columbus, O.; Cedar Rapids, Ia.; Colorado Springs, Col.; Butte, Mont.; Dunkirk, N. Y.; Danville, Ill.; Decatur, Ill.; Daveport, Ia.; Des Moines, Ia.; Denver, Col.; Erie, Pa.; Evanston, Ill.; Fort Scott, Kan.; Geneva, N. Y.; Grand Rapids, Mich.; Hornellsville, N. Y.; Harrisburg, Pa.; Hazelton, Pa.; Indianapolis, Ind.; Johnstown, Pa.; Janesville, Wis.; Kenosha, Wis.; Kansas City, Mo.; Lockport, N. Y.; Lebanon, Pa.; Lansing, Mich.; Lasalle, Ill.; La Crosse, Wis.; Mahanoy City, Pa.; Marion, Ind.; Muncie, Ind.; Marinette, Wis.; Muscatine, Ia.; New Haven, Conn.; Newburg, N. Y.; New York, N. Y.; Ottumwa, Ia.; Pawtucket, R. I.; Pottsville, Pa.; Quincy, Ill.; Reading, Pa.; Springfield, Mass.; Scranton, Pa.; Shenandoah, Pa.; Springfield, Ill.; St. Paul, Minn.; St. Joseph, Mo.; Sedalia, Mo.; Seattle, Wash.; Salt Lake City, Utah; Tiffin, O.; Terre Haute, Ind.; Topeka, Kan.; Vincennes, Ind.; Wilkesbarre, Pa.; Wilkinsburg, Pa.; York, Pa.; Youngstown, O.—[EDITOR.

Electric Light Information

PASADENA, Cal., Dec. 24, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

Will you kindly send to me at once the names of cities that own and operate their own electric light plants, especially for street lighting, or, better still, any information that will help me to learn the cost of plants, operating, etc. I send to you to save time and to be put on the right track. M. H. WEIGHT, *Mayor.*

Of the 137 largest cities in the United States, the following own and operate their own electric light plants: Chicago, Ill., plant valued at $2,234,642; Detroit, Mich., plant valued at $851,655; Allegheny, Pa., plant valued at $406,812; Columbus, O., a small plant supplying only a portion of the light required by the city, valued at $68,911; St. Joseph, Mo., plant valued at $98,752; Grand Rapids, Mich., plant valued at $193,309; Wheeling, W. Va., plant valued at $135,221; Little Rock, Ark., plant valued at $35,557; Galveston, Tex., plant valued at $65,000; Tacoma, Wash., plant valued at $502,230; Springfield, Ill., value not given; Topeka, Kan., plant valued at $77,800; Taunton, Mass., plant valued at $158,242.

By referring to page 227, of our November issue, under the captions of "Cost of Lighting Large Cities," and "Successful Municipal Lighting," you will find numerous references to the articles upon this question, which have appeared in the MUNICIPAL JOURNAL AND ENGINEER during the past two years. By corresponding with the mayors of any of the cities named you will probably be able to secure their last annual reports together with other valuable information relative to the construction, equipment and maintenance of the plants, all of which should be in your possession before arriving at any conclusion.

You should, by all means, procure a little handbook of about one hundred pages, entitled, "Finances of Gas and Electricity Manufacturing Enterprises," by William D. Marks, price $1.00, which contains most valuable information calculated to prevent persons like yourself from making mistakes. In addition to this I give the titles of the following list of books, any of which will be sent upon receipt of price: "Electric Light Plants, Their Cost and Operation," by W. J. Buckley. 1894. 275 pp. $2.00; "Continental Electric Light Central Stations with Notes on the Methods in Actual Practice for Distributing Electricity in Towns," by Killingworth Hedges, London. 1892. 210 pp. $6.00.—[EDITOR.

Comparative Cost of Street Paving

CHARLESTON, S. C., Dec. 18, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

I am in search of comparative statements of the cost and advantages of various methods of street paving. I would thank you if you can advise me where it can be obtained. I desire information as to the first cost of paving, maintenance of same, and comparative utility of the various kinds, such as Belgian block, asphalt, and vitrified brick. I would like to have information showing relative cost of maintaining vehicles in cities where several kinds of pavements are used. F. H. MCMASTER, *Manager.*

It would be manifestly unfair to quote a few statistics relative to the comparative cost for construction and maintenance of pavements and their relative utility, for even if we were to devote several pages to the subject it would not adequately represent the paving situation in the United States. Therefore, we refer you to the following publications: "A Treatise on Highway Construction," by Austin T. Byrne. 3rd edition, 1896. 8vo, 771 pp. cloth, $5.00; "Street Pavements and Paving Material. A Manual of City Pavements: the Methods and Materials of Their Construction," by George W. Tillson, Chief Engineer, Borough of Brooklyn, N. Y. 1900. 8vo, 532 pp., cloth, $4.00; "A Text Book on Roads and Pavements," by Fred P. Spalding. 1894. 12mo, 213 pp., cloth, $2.00; "City Roads and Pavements," by William Pierson Judson. 2nd edition. 1901. 195 pp., cloth, $2.00.

The work of Mr. Tillson is the best one of the lot, as it is the most exhaustive and thorough in its treatment of the subject, giving a large amount of just the information desired. The work of Mr. Judson is next in preference.—[EDITOR.

The Modern Roller Lift Bridge

CAMDEN, N. J., Dec. 1, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

The Camden County Board of Freeholders are contemplating making some change in a draw bridge over Cooper's creek in this city, to prevent congestion of traffic. Can you give me some information about the operation of roller bridges, such as are used in Chicago, the time it takes to open and close them, and the cost of construction?

WILLIAM H. JEFFERYS, *City Editor.*

The lift bridges which are used in Chicago are of the Scherzer type. The movable parts of the bridges are supported by piers placed on the sides of the navigable channel, and no centre pier support is necessary. The entire navigable channel is available and is unobstructed for the passage of vessels. The span of the bridge may be made large enough to fulfill any requirements of navigation without impairing the simplicity, safety or efficiency of the bridge.

It moves when opened in the most advantageous direction; that is, the vertical direction entirely within the lines of the roadway; it does not encroach upon or interfere with adjacent bridges, adjacent docks or adjacent water way, nor would it interfere with any future additions to the width of the bridge.

The dredged channel of a waterway need not be widened to accommodate a centre pier and protection pier, as these obstructions are not necessary with this style of bridge.

When opened for the passage of vessels, the bridge acts as a barrier closing the roadway, thus absolutely preventing the many disastrous accidents common to swing bridges when opened. Several of these dreadful accidents have been recently averted and commented upon by the Chicago papers. Without additional cost the bridge itself forms a most perfect, substantial and successful bridge gate.

The large unobstructed opening in the direct line of the navigable channel, obtained by the use of this bridge, permits the rapid passage of vessels, and as a partial opening of the bridge will be sufficient for the passage of small vessels, the power expended and the time occupied in opening and crossing the bridge are both reduced to a minimum. The large bridges of this type now in use are usually completely opened or closed in less than thirty seconds, and receive highway or railroad traffic in less than one minute from the time the bridge begins to close. A swing bridge cannot be operated so rapidly and safely, nor can vessels pass through the narrow openings provided by the swing bridge so rapidly.

It is not expensive in construction or operation as has been demonstrated by a variety of bridges of the type; notably, the four-track railroad bridge at Chicago, in successful operation for more than six years, during which time it has safely carried more than 1,200 trains each day and accommodated the passage of more than 6,500 large vessels each year, an unparalleled record for a movable bridge; the six-track railroad bridge for the N. Y., N. H. & H. R. R. Company, at Boston, Mass., and Bridge No. 4 for the C., C., C. & St. L. Ry. Company, at Cleveland, Ohio, and other railroad and highway bridges.

This bridge uses the most perfect and simple known mechanical method to overcome friction. It moves by means of a large circular wheel, rocking upon a perfectly smooth and level track. In this respect it differs fundamentally from the pivot or trunnion bascule bridge, in which the friction on the pivots or trunnions increases enormously with every increase in length or weight of span.

The electrical power consumed in operating this bridge is comparatively trifling, because the movable spans are perfectly counterbalanced and roll or rock virtually without friction in opening or closing. The movable spans of even the largest bridges respond and acquire a momentum so rapidly that the current is usually turned into the motors for less than twenty seconds for a complete operation of opening or closing the bridge.—[EDITOR.

Convict Labor to Build Good Roads

LEAVENWORTH, Kan., Dec. 18, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

In the next session of the Kansas Legislature I intend to introduce a bill which will utilize our convict labor, now housed up in the penitentiaries, on the state roads. There are many details connected with this matter of which I am ignorant. If there is any literature upon the subject which you can cause to be sent to me, I will appreciate very much your kindness. I was referred to you by the Leavenworth *Times.* O. G. BALLARD.

Convict labor has been used, in a small way, in the states of New York, New Jersey and Oregon. It has been employed much more extensively in Southern states, as will be observed by the tabular statement given below. By applying to the proper authorities of the various states more complete information can be secured.

	Counties in State.	Counties heard from.	Counties using convicts.	Convicts so employed in State in 1900.	Cost of guarding and maintenance convict per day.	Cost per prisoner per day for keeping in jails.	No. prisoners usually kept in jails.	Average cost of labor per day.
					Cts.	Cts.		
Alabama	66	66	2	25	81	30	789	$0.90
Arkansas	75	70	21	62	85	75	320	.95
Florida	45	44	11	106	46	40	437	.92
Georgia	137	129	27	916	26	35	1,073	.59
Kentucky	119	109	42	419	52	50	583	1.00
Louisiana	59	57	9	67	50	40	337	1.03
Mississippi	75	74	12	113	25	30	397	.62
North Carolina	97	97	24	643	24	30	607	.75
South Carolina	40	36	32	579	18	30	404	.75
Tennessee	96	88	37	722	26	40	888	.79
Texas	229	214	65	672	30	45	1,197	1.14
Virginia	100	95	5	23	38	30	329	.79

As will be seen from this table, the use of convict labor in public road building is most largely practiced in the States of Georgia, Tennessee, Texas, North Carolina, South Carolina and Kentucky, in the order named. In Virginia, where only twenty-three convicts are reported as having been used on the public roads of the State, and these

confined to four counties, and in Alabama, where only twenty-five convicts are reported as being used on the public roads, in two counties, the system is still in its infancy. In Arkansas, Florida, Louisiana and Mississippi it has been more largely adopted; but in these States only short term convicts are used; in most of the counties the number so employed is small, and consequently, as is also the case in Alabama the per capita expense is large. Hence, even in these States, the custom has not yet been established on an entirely satisfactory basis.

Laws in the different States usually specify that in the assignment of convicts to work on the public roads, only able-bodied males, sentenced for short terms, are to be selected. In the few cases where women are included in the provisions of these laws, they are employed in cooking or washing for the prison camps. Thus, for example, in the States of Virginia, West Virginia, Kentucky, Tenessee, Louisiana, Mississippi, Texas, Florida, Georgia, only such convicts as are guilty of misdemeanors may be assigned to work on the public roads, and for these the sentence does not usually exceed one year, which, when the costs are added, may be thereby extended to nearly two years in extreme cases. In Alabama, in a few cases, all able bodied male convicts, whose terms of sentence do not exceed two years, may be assigned to work on the public roads. In South Carolina all such convicts are assigned to work on the public roads whose terms of sentence do not exceed five years, and in North Carolina this limit is extended to ten years.

The North Carolina law controlling the assignment of convicts for public road building purposes is, perhaps, the most sweeping to be found in any of the Southern States, and may be quoted as follows:

As a rule it has not been found economical to work convicts on the public roads when the squad consisted of less than ten men; it is customary to have one guard for each ten men, and of course this one guard is necessary, even were there only one or two men in the squad. In addition to the guards there is usually a superintendent of the work; consequently, this work is carried on most efficiently when the road force or camp contains from thirty to fifty men. When the number of convicts to be employed on the roads in any county approaches 100, it has been found better to divide the force into two squads or camps, each of which will have its own local superintendent and guards, and both squads will be managed under the general supervision of the county superintendent of roads, he in turn being responsible to the County Court or Board of County Commissioners.

It is usually urged against this system of road building that it offers too many opportunities for the escape of prisoners. Experience in many counties, however, has shown that the average annual escapes amount to less than one per cent. Usually the prisoners assigned to the roads are men who live in the community and have families and some property there, and consequently do not care to leave permanently; hence they rarely attempt to escape. Such prisoners as show a desire to escape, or who, in the judgment of the superintendent, are men liable to make an effort in that direction, are usually required to carry a ball and chain, which, while it makes it impossible for the prisoner to run rapidly, yet it does not seriously hamper his movements connected with the regular work.

At the close of the day the prisoners are marched along the road to their temporary quarters, which consist usually of either heavy, large tents, portable houses on wheels, or portable houses built either of wood or corrugated iron—built in section so they can be easily taken to pieces, removed and set up again. In order to facilitate their being safely guarded during the night, without too great risk and expense, each prisoner, when he goes to bed, has either one foot or one hand fastened loosely to a chain or rod, from which he can be easily released the following morning. The beds or bunks for these convicts are easily and cheaply made comfortable, and the comfort of their temporary quarters is improved during the summer by ample ventilation, and during the winter by the use of stoves.

The cooking and washing at the camps is usually done by some trusty male convict, who is especially experienced in that direction, or by the female prisoners, or in still other cases by hired labor. The carrying of water, along with other similar errands, is usually assigned to the younger prisoners or such as may not be sufficiently strong for the regular work on the roads. Isolated jobs are usually assigned to certain prisoners who, from their associations and generally good character, are considered safe for carrying on such work without the immediate supervision of guards, and such prisoners are usually designated the "trusties" of the camp.

The work of road building is usually extended to a distance of 1 or 1½ miles in each direction from the camp, and the camp is then moved a sufficient distance so that two or three miles of additional road may be built before a second removal becomes necessary.

The work done by these convict road builders includes everything there is to be done. Thus in counties like Mecklenburg (in North Carolina), where great efficiency has been reached in macadamizing, everything except the guarding and the general supervision of the work is done by convicts. They drive the teams, handle the shovels and picks, ride the road machines, run the engines, operate the stone crushers and great steam rollers. In other counties they spread the gravel, and in still other counties they mix the sand and gravel and clay and make these into roads.

The cost of convict labor in road building, as might be expected, varies greatly with the efficiency or inefficiency of the management and the number of prisoners employed in any squad. Thus the cost per convict per day in this work, including the cost of his feed, tobacco, clothing, washing, medical attendance, and guarding, as reported for the year 1900, from representative counties in each of the several Southern States, range as follows:

Arkansas	75 cents to $1
Florida	30 cents to 50 cents
Georgia	16 cents to 32 cents
Kentucky	50 cents to 60 cents
Louisiana	50 cents to 60 cents
Mississippi	15 cents to 45 cents
North Carolina	15 cents to 40 cents
South Carolina	17 cents to 22 cents
Tennessee	20 cents to 40 cents
Texas	20 cents to 40 cents
Virginia	25 cents to 50 cents

In a number of counties where this work is carried on most efficiently this cost ranges from 20 to 30 cents per day per convict.

By referring to the table given above it may be seen that this cost of convict labor ranges in several States at from one-third to one-half the cost of hired labor on public roads in these States. In the two Carolinas and Georgia, where the work is carried on with great efficiency, the cost of maintaining and guarding the convicts at work on the public roads is even considerably less than the cost of feeding them in the county jail. In explanation of this fact it may be said that while the convicts are employed on the public roads provisions are purchased at wholesale and competitive rates, and the convicts do their own cooking and washing; and owing to the unusually healthy condition of the convict camps, the cost of medical attendance is almost nothing.

As to the efficiency of convict labor on the public roads as compared with that of ordinary labor, the general testimony from the many counties in the Southern States is highly in its favor. It must be borne in mind in this connection that hired labor, which in the Southern States can be secured for work on the public roads, does not belong to the most efficient class; and it is labor which cannot be easily held longer than a few days or a week at a time; consequently it is not altogether satisfactory. In the case of convict labor, on the other hand, and this becomes more especially true in the case of long term prisoners, the labor is entirely under the control of the guard and superintendent, and it can be easily managed so as to reach a satisfactory degree of efficiency. The prisoners who are sentenced for longer terms, and who show any measure of skill, are trained to handle the road machines, graders, scrapers and plows, the engines, rock crushers and the rollers, and they not only make efficient laborers while engaged in this work, but receive that training and experience which enables them to earn a better living, and hence become better citizens after the expiration of their terms of sentence.

It has been, therefore, the general verdict from various counties in the Southern States, where convict labor is used in road building to any considerable extent, that in both efficiency and cheapness it is decidedly superior to the ordinary free labor which can be hired for this work.—[Editor.

Personalities

—Mr. Edward L. Smith, was elected Water Commissioner by the Council of Hartford, Conn., succeeding Edward H. Judd, deceased.

—Mayor Livingston Mims of Atlanta, Ga., is preparing his book entitled, "Loose Leaves, a Volume of Reminiscences," which is to be published in the near future.

—The Council of Augusta, Ga., will elect, at its first meeting in January, a City Clerk and City Auditor to fill the vacancy caused by the death of Rev. J. S. Paterson.

—Mr. John M. Harlan has declared his intention of running for Mayor of Chicago. Mr. Harlan has been a candidate for this office before and was defeated, but he intends to try again.

—Mayor Ignatius A. Sullivan, of Hartford, Conn., recently delivered an address before the Hartford Landlords and Taxpayers Association on "Municipal Ownership of Public Utilities."

—Mr. Emil Kuichling, Engineering Editor of THE MUNICIPAL JOURNAL, was one of the speakers at the first annual banquet of the Rochester Engineering Society, held in that city on December 29.

—Mr. William D. Williams, City Attorney, of Fort Worth, Texas, recently handed in his resignation, which was accepted by the Council. Alderman E. C. Orrick was elected to fill his unexpired term.

—City Engineer Edward R. Cary, of Troy, N. Y., was removed from office by Mayor Daniel Conway because he refused to comply with the Mayor's wishes in sanctioning certain propositions. No charges were preferred.

—Mr. George H. Moffett was elected Corporation Council of Charleston, S. C., by the City Council to fill out the unexpired term of three years left vacant by the resignation of Mr. George S. Legare, who has been elected to Congress.

—The Hon. Jesse Walling, Mayor of McMinnville, Tenn., surprised the Board of Aldermen recently by offering his resignation. His reason was the pressure of private interests. He has been Mayor for twelve years at varying intervals.

—The Board of Mayor and Aldermen of Birmingham, Ala., elected the following officers for the coming year: City Treasurer, G. C. Engstfeld received a second term; W. B. Copeland was again made City Auditor; City Clerk J. C. Murray received re-election; Capt. Edward D. Smith was re-elected City Attorney without opposition; Street Commissioner John A. McCartin and City Engineer Julian Kendrick, were re-elected.

—Mayor Riggins, of Waco, Texas, who was impeached not long since by the City Council and ordered removed from office on the ground that he neglected the affairs of the city in attending to the interests of the liquor dealers, has vetoed the action of the Council impeaching him. A conflict of authority has arisen, as some of the officials recognize Mayor Riggins as mayor, while others recognize Mr. Richards, Mayor pro tem, who was installed by the Council.

—The contest over the election of mayor in Ithaca, N. Y., was decided by the Supreme Court in favor of Mr. Miller, the Democratic candidate. Just after election it was announced that Mr. Miller and former Mayor Gunderman, each had 1,648 votes, but a protest was made and the court ordered one of the voting machines opened, when it was found that Miller had seven votes more than was accredited him on the official canvas. Thus the usefulness of voting machines was demonstrated.

—Mayor R. R. Wright and eleven aldermen of Denver, Col., have been sentenced to four months in the county jail for contempt of court. Judge Mullens of the State District Court enjoined the aldermen and the mayor, on petition of a taxpayer, from passing an ordinance granting a franchise to a railway company. The municipal League of the city opposes the franchise because it was given the company free, and the injunction proceedings followed. Mayor Wright ignored the injunction, however, and signed the ordinance after it was passed by the aldermen. The mayor and several of the aldermen immediately left the city, but upon return were arrested.

—Mayor Edwin W. Fiske of Mount Vernon, N. Y., has been mayor of that city for six years, but the present Republican Board of Aldermen have determined to make his present term anything but a sinecure. An investigation has been started into the conduct of city affairs, and it is claimed that there is a discrepancy of at least $20,000 in the accounts of one of the former Receiver of Taxes. One of the complaints against the Mayor is his appointment of the present Police Commissioners, who have been conducting affairs contrary to the good reputation of the Police Department of that city. Chief of Police Foley, however, is an upright man and will not allow his force to be used in any way contrary to law, nor will he allow any interference by outside politicians with the duties of any of his police officers. Some of the taxpayers have obtained an injunction restraining the further investigation of the city affairs on the ground that they are not willing to spend money merely for the sake of punishing past misdeeds when none of the embezzled money can be recovered. The Council recently declared vacant the offices of two of the police commissioners because, contrary to law, their oaths of office were not filed with City Clerk Hoyt.

—The result of the mayorality election in Massachusetts during the last month was as follows:

Lawrence,—Alexander L. Grant, Republican was elected over James F. Leonard, the present mayor, who was a candidate for a fourth term; Haverhill,—Henri R. Watson, Republican, was elected by a small plurality; New Bedford,—Mayor Charles S. Ashley, Democrat, was overwhelmingly re-elected for the ninth time; Taunton,—Richard E. Warner, Republican, was re-elected; Brockton,—Ex-Mayor Charles H. Coulter, Socialist, defeated Mayor David W. Battles, Republican, by a large vote; Marlboro,—Mayor Walter B. Morse, Republican, was re-elected; Pittsfield,—Mr. Harry D. Sisson, Republican, was elected; Waltham,—Murray D. Clement, Republican, was re-elected; Gloucester,—Common Councilman James E. Holman, Independent Republican, was elected after a hot contest; Northampton,—Mayor Henry C. Hallett, Republican, was re-elected; Fitchburg,—Charles H. Blood, Independent, was elected mayor; Quincy,—Mayor Charles M. Bryant, Republican, was re-elected by a small majority; Chicopee,—Mayor James H. Loomis, Republican, was elected for the third time; Holyoke,—Mayor Arthur B. Chapin, Republican, was re-elected for the fifth time; Salem,—Mr. Joseph N. Petersen, Republican, defeated Mayor John F. Hurley; Newburyport,—James F. Carens, Non-Partisan, was elected; Worcester,—Mayor Edward F. Fletcher, was re-elected; Beverly,—Mr. Davis was elected; Cambridge,—Mayor John H. McNamee, Democrat, was re-elected; Lowell,—Charles E. Howe, Republican, was elected; Chelsea,—Mayor Edward E. Willard, Republican, was re-elected; Everett,—Mayor Charles Bruce, Republican, was re-elected; Fall River,—Mayor George Grime, Republican, was re-elected; Lynn,—Mr. E. A. Eastman, was elected mayor; Malden,—Mayor Charles L. Dean, Republican, was re-elected; Medford,—Charles H. Baxter, Republican, was re-elected; Melrose,—Sidney H. Buttrick, Republican, was elected; Newton,—Mayor John W. Weeks, Republican, was re-elected; Somerville,—Mayor Edward Glimes, Republican, was re-elected; Woburn,—Mayor John F. Feeney, Democrat, was re-elected; Springfield,—Everett E Stone, Republican, was elected, as well as City Treasurer W. E. Tifft, who will serve a second term; North Adams,—Dr. Frank D. Stafford, Republican, was elected.

Convention Dates

JANUARY

The State Good Roads Convention will be held at Springfield, Mo., January 8-10. G. W. Waters, Canton, Mo.

The State Firemen's Association meets at Aurora, Ill., January 13. Walter E. Price, Champaign, Ill.

A conference of the health officers of Michigan will be held at Ann Arbor on January 16. Secretary Baker, State Board of Health, Lansing, Mich.

A convention of the good roads organizations of the State of New York will be held at Albany, January 20-21.

FEBRUARY

The National Brick Manufacturers' Association will hold its seventeenth annual convention at Boston, Mass., February 4-7. Theodore A. Randall, Secretary, Indianapolis, Ind.

The sixth annual convention of the League of Ohio Municipalities will be held at Hamilton, O., February 10, 11 and 12. Dr. S. O. Giffin, secretary, Columbus, O.

American Road Makers meet in annual session at Detroit, Mich., Feb. 13-14. W. S. Crandall Secretary, 253 Broadway, New York.

NEWS AND PRACTICE AMONG THE CITIES

Municipal Lighting in Holyoke—New Public Buildings in Washington—Shaft Ventilation of Sewers—Profitable Chicago Water Works—Newark Repairs Its Asphalt Economically

May Filter Trenton's Water

THE Filtration Committee of the Board of Health of Trenton, N. J., is about to make a visit to several cities for the purpose of determining whether or not Trenton needs a filtration plant for the purification of its drinking water. Col. Thomas S. Chambers, William H. Milburn and Francis B. Lee are the members of the committee. Besides visiting the cities, the drinking water of Trenton will be submitted to a chemist for an elaborate analysis.

Price of Gas Reduced

THE Board of City Trustees of Sacramento, Cal., recently passed an ordinance fixing the rate for manufactured gas at one dollar per thousand feet. The ordinance was signed by Mayor Clark, but the owners of the gas plant no doubt will fight the matter in the courts. The old rate was $1.75 per thousand feet, and the company will probably endeavor to enforce this charge, and if a consumer refuses to pay, either take out his meter or sue him for the difference.

New Officers for Health Association

AT the closing session of the thirteenth annual meeting of the American Public Health Association, which met at New Orleans in December, the following officers were chosen for the coming year: President, Dr. Walter Wyman, surgeon general of the United States Public Health and Marine Hospital service, of Washington, D. C.; first vice-president, Dr. C. P. Wilkinson, of New Orleans; second vice-president, Dr. John L. Leal, of New Jersey; treasurer, Dr. F. W. Wright, of Connecticut; secretary, Dr. C. O. Probst, of Columbus, Ohio; executive committee, Dr. John L. Fulton, of Maryland; Dr. John Amyot, of Toronto; Dr. Jose Ramirez, of Mexico.

The officers of the Bacteriological and Chemistry section for 1903 were announced as follows:

Chairman, H. L. Russell, of Wisconsin; vice chairman, V. A. Moore, of New York; secretary, G. C. Whipple, of New York; recorder, H. D. Pease, of New York; council, W. H. Park, of New York; M. J. Rosenau, of Washington, D. C.; E. J. Horton, of Columbus, O.; Angel Gavino of Mexico; Dr. F. F. Westbrook of Minneapolis, Minn. The next place of meeting of the Association will be at Washington, D. C.

New Public Buildings for Washington

AFTER years of petitioning, the Commissioners of the District of Columbia have been gratified by the action of Congress which provides for the purchase of a site for a district government building. The Government at Washington has always lived in rented and unsuitable quarters but will now have a home of its own. The sum of $5,500 was paid for the site, which will be bounded by 13½ East 14th and E streets. A commission was provided by Congress for the construction of the building, and this commission invited several well-known architects to compete for the plans. On the 5th of December the plans were received and opened, but up to the time of going to press the selection of the successful architect has not been made known. The District is also to have a magnificent municipal hospital, the architect having been already selected, and as soon as Congress provides the necessary funds the building will be started. Mr. Carnegie donated the sum of $350,000 for a public library and the commissioners report that this has been constructed and is ready to be decorated. As the appropriation was exhausted in the construction of the building, the decorations will have to be postponed until money is saved from the yearly maintenance account to do the work.

Holyoke Takes Over Lighting Plants

THE trouble between the city of Holyoke, Mass., and the Holyoke Water Co. was settled recently and the city is to take over both the gas and electric plants of the company to be run as municipal plants. It is hoped that by means of city ownership the necessary extension of gas and electric lights will be accomplished. At the hearings of the commission appointed to appraise the value of the plants, the company claimed that the capacity of the water gas plant was about 700,600 cubic feet per day, and that of the coal gas plant from 500,000 to 700,000 cubic feet per day. The company considered that the gas plant was worth $850,000. The city thought that $300,000 would be ample for the works, but the award of the commissioners, which was accepted, placed it at $706,543 for both the light and the gas plants. The company fixed the value of its electric light plant and eight mill powers, at $503,630. Again the city did not consider it worth more than $200,000 at the most. The gas plant has been in operation for over half a century and its capacity has gained gradually with the years. The electric light plant was not installed until 1884 and then only on a very small scale. In 1891 the present large building was constructed. At the present time there are 262 arc lights and it is stated that the first thing to be done by the city will be to increase this number. The present equipment includes five 50-arc, one 40-arc, two 25-arc, and eight 30-arc machines, and provision has been made in the construction of the plant for considerable increase, which it is probable the city will install very soon. As regards incandescent service, the 3,000 light capacity has been entirely used up, and this portion of the electric plant will be attended to first. Efforts are to be made by the city to greatly enlarge the commercial business of the plant and thus insure the financial success of the project.

A Suggested Change in Toronto's Charter

A RESOLUTION has been introduced in the Council of Toronto, by Alderman Currie, looking toward the separation of the legislative and administrative branches of the city. Alderman Currie desires that an Executive Board be formed of the heads of the principal departments, and that these gentlemen be removed as far as possible from political influence. The Board would carry out instructions of the legislative body and therefore should be possessed of technical as well as business knowledge. By means of this method experts in municipal subjects could be secured, and money saved and failures prevented, because aldermen, as a rule, are not versed in technical matters and should have nothing to do with the practical carrying out of any scheme they might inaugurate.

Alderman Currie maintains that the City Council holds the same position toward the taxpayers as a board of directors holds toward the shareholders of a commercial company. Consequently the good business management and dividends of the one are paralleled in the other by efficient service which would result in a minimum rate or taxation. While the Alderman admits the good intentions of his associates, their lack of technical knowledge handicaps them and any work they wish to carry out. At the present time, in Toronto, the actual work of administration is carried out by the Board of Control and several committees, and much trouble has arisen because of members trying to attend to details which should be left to special officials. "The municipality which will appoint competent men to position and follow their advice, will be better and more economically governed than one which depends upon indifferent officials and aldermen no matter how representative and capable in their own affairs, who are not acquainted with the interests of a municipality and have not the time to closely study the various problems."

Moving Sidewalk for Hill

A novel project has been agitated among the residents of one of the streets in Schenectady, N. Y., and that is to have one of the sidewalks converted into a moving stairway to carry people up the hill, which happens to be steep at this point. The idea is to have two stairways, ten feet in width, one going up the hill and the other down, and the promoter has been trying to interest the city officials in the matter so as to form a company to carry out the idea. To pay for the cost of construction and operation it is proposed to charge one cent per passenger for using it, and this, he estimates, would provide a fair dividend on the cost, which is estimated at $7,500.

To Make Garbage Crematory Profitable

THE city of Milwaukee, Wis., has been having considerable trouble with its garbage incinerator because the city has not yet learned how to run the plant economically. In order to reduce the outlay and to provide for a source of income from the refuse matter, a proposition has been made by a local chemist to utilize the incinerated refuse as a fertilizer. It is predicted that the fertilizer obtained from the plant will be rich in phosphates and potash salts, and should sell at not less than one dollar per ton. At the present time the city buries all the dead animals that it collects, but it is proposed to use these as additional matter for cremation in order to further increase the value of the incinerated refuse. If the promoters of the idea are not disappointed in their plans, the garbage crematory will become a municipan rendering plant, and if carefully conducted, will be self-sustaining.

Another Town Paves with Gold

IT is not every town that can afford to lay gold ore pavements, but this distinction has come to the town of Altman in the gold mining region of Colorado. This town is claimed to be the highest incorporated town in the world, and for some time has been paving its streets with rock taken from the waste dump of one of the gold mines. Samples of this were taken from time to time and assayed, showing a value of about $20 a ton. When this fact became known, men began to remove the street surface to such an extent that police had to interfere, and the owners of the mine dump have refused to allow the rock to be taken for paving.

Building Regulations in Paris

THE regulations regarding the erection of buildings in Paris, France, have been lately changed to satisfy the modern requirements of hygiene, etc. If the road is less than thirty-nine feet wide the heighth of the building must not exceed the width of the street by more than nineteen and one-half feet. Consequently a house may be fifty-nine feet high and for every additional thirty-nine inches in the width of the road, ten inches may be added to the heighth, until a limit of sixty-five feet is reached, above which no building may extend. In all dwellings whatsoever the heighth of the ceiling of the ground floor shall not be less than nine feet and two inches. Another provision of the regulations provides that any shutter or sunshade placed not more than ten feet above the pavement either must be within the body of the wall, or must not open outwards.

City Repairs Asphalt Economically

ASPHALT repairs in Newark, N. J. are done by the city, which owns a Hooke asphalt fire wagon. "The method of operating the plant is not different from that employed by the contractors for this class of work," said General Superintendent J. C. Mundy. "I have old asphalt which has been taken from the streets and the binder scraped off, broken up into small pieces and placed in the melting pan. Before doing so about three gallons of water are put in the pan. When the asphalt is melted the residuum oil and asphaltic cement are added and the mixture is ready for use. The repairs which have been made six months seem to be perfect and cannot be detected, and I have found the fire wagon both useful and economical. By using this old asphalt combined with the residuum oil and asphaltic cement, I find that the cost of repairing is seventy-five cents per square yard. This does not include the cost of the foreman who oversees other street repairs."

License Tax Increased

DURING the past year the license tax in Atlanta, Ga., has increased to such an extent that in making the estimates for the city for the coming year, the income from licenses has cut quite a figure. Not only will the tax bring in considerable revenue, but it is also an indication of the growth and development of the city, for this money can represent nothing but the actual business done. From all appearances, it is probable that the coming year will see a still larger income from licenses.

Shaft Ventilation of Sewers the Best

THE Local Government Board in England recently made inquiry concerning the ventilation of sewers and the answers to the questions contain interesting facts. The one important question for American officials was, "Have you abandoned surface ventilation of sewers?" Seven towns replied that surface ventilation was never abandoned and in four towns surface ventilation was never adopted. In twenty-eight towns surface ventilation has been entirely abandoned or is being done as fast as it is possible to do so. Some portions of the towns have been entirely equipped with shaft ventilators. The city of Lincoln places closed covers over sewers, about which there is complaint. In the town of Sutton, shafts are erected except where man-holes have a deodorizing plant affixed. The answer from Brighton states that ventilation shafts are considered useless unless surface ventilators in the neighborhood are removed. Canterbury, which has a population of 25,000, has always ventilated its sewers by tall upright shafts. In Leicester, which has a population of 220,000, all new sewers are so equipped, and wherever a complaint is received from an old sewer, a shaft is immediately erected. This is also true in the city of Norwich, where nothing but standard vent shafts are applied to both old and new sewers. Turnbridge, with a population of 13,000, has been equipped with five miles of new sewers ventilated by shafts. The general opinion from the thirty-six replies received is to the effect that emanations of sewer gas on street level are objectionable and that ventilation by shafts is the only proper method.

City Ownership of Water Works Pays

A RECENT criticism of the water supply of Chicago has roused Supt. H. O. Nourse of the Bureau of Water of that city, and he has given the following facts concerning the water department to prove that the system pays and that the critics who decry municipal ownership are wrong. The total receipts for water during 1901 amounted to $3,504,457.81. For maintenance of the physical system, including maintenance and attendance of cribs in the lake, the conducting of water to the mains and pumping stations, for fuel, repairs and attendance, repairs to mains, hydrants, etc., extending mains as need demanded in new localities, for installing meters, salaries for inspections, meter registration, and everything connected with the collecting of water rates, the cost was $1,812,304.18. This left a profit of $1,692,153.63. From this must be deducted the interest paid on outstanding bonds, which was $252,317.68 and certificates and bonds redeemed, which amounted to $560,000. Deducting these sums from the profit a surplus of $923,835.96 still remains. As the intercepting sewer system was constructed mainly to prevent pollution in the lake, and thus increase the purity of the water supply, the cost of this system, $417,611.28, should be deducted from the surplus, leaving a final surplus for the year, of $506,224.67. At the beginning of the year there was a balance of $596,830.98 on hand, and this, together with the surplus of 1901 gave a total at the end of that year, of $1,102,555.65. This sum has been appropriated by the council for the purpose of completing the intercepting sewer system. The water rates in Chicago are very low, but sufficient to produce the surplus given above. This is one point, and a good one, in favor of the successful management of the water system, and it is questioned by Superintendent Nourse whether a private corporation would sacrifice its dividends and salaries by subscribing this sum of over a million dollars for improving the sewer system. The Superintendent admits that the sewage of the city has made impure the water supply, but states that when the sewer system is completed this pollution will be greatly reduced, if not entirely obliterated.

Regulations for Posting Bills

An ordinance was recently introduced into the Council of Binghamton, N. Y., to regulate bill posting and distributing in the city. Under its provisions licenses must be taken out by bill posters for one year, at a cost of $40. A bill distributor's license is to cost $25 per year, and in each case a bond of $1,000 must be filed with the city.

The prices for the distributing of bills and advertisements and the posting of bills are not to exceed the following: Posting bills for any entertainment or business, three cents a sheet; distributing almanacs, pamphlets or books to private houses, $2.00 per thousand; distributing bills, circulars, and notices to private houses, $1.75 per thousand; distributing bills, circulars and notices to business houses and offices, $1.50 per thousand. Advertising matter must not be left within a building and nothing but legal notices are to be fastened to any telegraph or telephone pole. No advertisement is to be posted upon any fence or building without the consent of the owner, and no advertising matter containing pills, powders, or medical preparations of any kind, shall be delivered to any person except an adult. This ordinance, however, does not extend to the merchants of the city who may desire to distribute bills advertising their business.

Changes in San Francisco Charter

At the election held in San Francisco on the fourth of December, seven of the eight charter amendments were adopted. Amendment No. 1 dispenses with the present requirement of plans and estimates for all public utilities every two years and substitutes therefor that plans and estimates relative to some particular utility shall be obtained only when the Board of Supervisors considers that the said utility should be acquired by the city. The second amendment submits to vote a proposition to incur bonded indebtedness for land as well as for building and authorizes the submission at one special election of several propositions for incurring debts, etc. The third amendment allows one railway to use the street tracks of companies. Amendment No. 5 provides that street work can be initiated only by the owners of the property affected, by the Board of Health for sanitary reasons, or by the Board of Supervisors, by a resolution which is to be sent to the Board of Public Works. The amendment also states that when not more than two blocks of any street remain to be graded, the work can be done by the Board of Public Works regardless of the objections of the property holders. According to amendment No. 7, the sprinkling and cleaning of streets can be done by contract or by employees of the Board of Public Works, and the Board is empowered to purchase necessary appliances, with the consent of the Supervisors. The last amendment provides that a sum not exceeding $5,000 may be appropriated annually for the relief of aged or infirm firemen, who have served in the volunteer department between 1850 and 1866.

Who Shall Pay for Repaving?

The question that the financial department of Buffalo, N. Y., has been considering is, who shall pay for the repaving of streets—the owners of property along those streets, as is done at present, or the city at large, as is done in other places, or shall the expense be distributed, partly on the property abutting and partly on the general fund. A member of the last commission to revise the city charter said that he was in favor of placing two-thirds of the expense for repaving on the general fund and one-third on the abutting property. Col. Ward, Commissioner of Public Works, believes that the whole cost of repaving the streets should be paid for by the general fund. This latter idea is objected to on the ground that a great deal of rivalry would arise between the residents of streets, as to who would get the best pavement, with the danger of extravagant outlay by the city, but on the other hand, if the property owner felt that he would have to pay a part of the cost he would take an interest in seeing that the original pavement was suitable, durable and well laid. In case he does not have to pay any of the cost of the second paving, he will strive to see that the first pavement is very cheap, inasmuch as the second paving would be done at the expense of the city. The suggestion that the cost of repaving be one-third on the property abutting and the rest on the general fund, is in accordance with the charter provision regarding repairs. The charter provides that so long as less than one-third of the pavement is out of repair it shall be called a repair job to be done at the expense of the city, but if more than one-third be out of repair, the cost is to be assessed upon the abutting property. Assessor E. G. Voltz suggested that the general fund of the city should be partially reimbursed for the expense of repaving by a tax upon every vehicle and draught animal that uses the streets.

The Drainage System of New Orleans

The first steps for the construction of the present system of drainage that is being carried on in New Orleans, La., were taken in July, 1895, when surveys and maps of the city were made and the present plan formulated. Eighteen months later the first contract for the work was let and it has progressed ever since uninterruptedly. A central electric power station was erected and from this center, power is sent out to operate the electrically driven pumping engines in the various stations. Six of the pumping stations have been put in operation and these have a capacity of 2,150 cubic feet per second, with a power of lifting varying from five to ten feet. Additional pumps have been installed lately which will add to the combined capacity of all.

Open and unlined canals, varying in width from thirty-five to eighty feet and about sixteen miles in length, have been constructed at a cost of $300,000. These are the out-fall canals from the pumping stations, the relief canals between the stations, and those tributary to them. Stone lined and covered canals, having a width of from five to twenty-five feet and a length of about fifteen miles, together with 14,000 feet of vitrified pipe from twenty-four to thirty-six inches in diameter, have been constructed in the populous sections of the city at a cost of upward of $2,300,000. In the outer sections of the city, open canals lined with wood have been constructed and have a width of from sixteen to eighteen feet and a length of about 9,000 feet. The cost of this amounted to $100,000, but it is proposed that when that portion of the city about those canals are built up that they will be lined with masonry as has been done in the case of the others. Before all of the plans have been fully carried out, it will be necessary to greatly increase the central power station and sub-stations, and to extend the system of canals and sewers many thousand feet. The cost of the incompleted work has been estimated at about $4,000,000. Practically all of the drainage will be pumped into Lake Pontchartrain, but it is stated that when the lake front becomes improved, as will be likely in the near future, all ordinary drainage will have to be diverted to Lake Borgne.

While the work that has been done and is being done at the present time, is all that was included in the first estimates, much more must be done according to the plans contemplated for the ultimate completion of the sewerage system. This includes the collection of all drainage from the streets by laterals or pipe lines emptying into the branch canals. The reason assigned why this latter work was not included in the first estimates was because of the same conditions which present themselves in connection with street paving and drainage. According to the usual method of paving streets, the cost to the city for drainage by means of deep gutters is placed at $1.35 per lineal foot. The cost to abutting property holders would average fifty cents per foot. The property holder whose land fronts on the street running from the river to the lake, is heavily assessed, while those on cross streets contribute practically nothing to the cost of surface drainage. The expense to the city for the work is largely due to cast iron cover culverts at the intersection of streets, the cost of which varies from $500 to $1,000 each. On the other hand, the cost of providing for drainage by means of sub-surface pipes previous to paving a street, ought not to exceed $1.35 per foot of property drained. This system, when considered from a sanitary as well as economical point, has many advantages over that of deep gutters for collecting drain water. In sections of the city where grades are already fixed, these sub-surface pipes provide a very cheap means of draining all low portions of property by the placing of tile drains, which are comparatively inexpensive, and will not only drain the surface, but effectually lower the water level, thus greatly improving the sanitary conditions. In cases where the grades are not thoroughly fixed, these sub-surface drians permit of the establishment of grades, conforming closely to the natural surface of the ground, which obviates the need of excessive filling in of lots. This of course, saves much expense.

Millions for a New Water Supply

At the special election held at Columbus, Ga., on the fourth of December last the citizens voted by an overwhelming majority in favor of the proposition to issue $2,500,000 worth of 4 per cent. bonds for building an entirely new system of water works to be owned and operated by the city. Superintendent of Public Works Robert L. Johnson writes that this means a distinct advance in the progress of the city. At the present time the city is supplied by a private company which has outgrown the plant. The company could not afford to put in an ample and satisfactory service and so the citizens have decided that the city itself should own and operate this branch of their public utilities.

Over Two Millions for Public Improvements

THE advisory committee on public improvements for the city of Oakland, Cal., outlined a scheme that was voted on at the last election. The subjects taken up were, parks and boulevards, city wharves, new city hall, schools and a library, fire department, and street improvement. The committee recommended that the marsh land on the west of the city be filled in and beautified at a cost of $150,000. The purchase of a large tract of land for the creation of a central park was considered by the committee but it decided that the citizens should first vote the requisite amount in bonds before anything should be done towards the acquiring of the land. For the purpose a bond proposition of $350,000 should be fixed for the voters and that a man of wide reputation in park work be secured to survey and lay out the grounds. Other and smaller parks are projected, and the whole appropriation would amount to $572,000 to carry out the plans proposed. The growing demands of the city for more wharves must be met by the authorities through the acquiring of shore land and the erection of docks as the needs of business require. Without such harbor improvements the water front of Oakland is practically useless. For the purpose of erecting a new and imposing city hall the sum of $400,000 was recommended by the committee. A like sum of money was advised for the purchase of sites and the building of school houses. The equipping of the new public library at $25,000 was recommended. The attention of the committee was directed toward increasing the efficiency of the fire department and it is estimated that $64,000 is needed to buy apparatus, build houses and purchase sites on which to locate them. Six houses in all are needed. The report of the committee stated that Oakland is wofully deficient in the matter of good streets and recommendations are made for the paving of portions of twelve streets with bituminous rock on concrete, curbed with granite and provided with catchbasins. The remacadamizing of other streets is necessary. The cost of this work was estimated at $469,350. While the subject of garbage crematory was not among the subjects referred to the committee, it took the liberty of recommending the erecting of this necessary building. The committee said that no one with any pride in the city could oppose the abolition of the unsightly and unhealthy dumping grounds on the outskirts of the city. The committee estimated that six furnaces would be necessary to take care of all the garbage of the city and these can be secured for $25,000. The committee strongly recommends the consideration of this report.

In summing up the report, the committee stated that "sectional jealousies, factional spirit, the want of confidence and the dread of increased taxation have contributed to retard the growth and prosperity of the city and the comfort and well being of its citizens." The recommendations above outlined are, in the opinion of the committee, absolutely necessary to attract to the city the population, capital and enterprise that Oakland so much needs. It is hoped that public sentiment will become aroused to the necessities that confront the city in this matter.

Stone and Wood Pavement in Brooklyn

THE question of the best pavement for a street is a mooted one as yet, although city authorities are endeavoring to solve the problem. The officials of New York City, under the present administration, have been experimenting with several pavements and have laid short stretches.

Medina sandstone block and modern wood block had never been laid in Brooklyn until the last year, but the Highway Department, ever ready to improve on the old, laid a block of the sandstone pavement and another of the creo-resinate wood block and are now waiting to see how both wear. Unfortunately for the success of the Medina stone, it was not laid on a concrete base and so the wearing qualities of the block could not be determined as the base has already given way, allowing the surface to cave in.

The block of creo-resinate wood pavement is still in the same condition as when the workmen left it last summer. There are about

CREO-RESINATE WOOD PAVING ON STATE STREET., BROOKLYN, N. Y.

1,200 square yards of the pavement. The blocks are of Georgia pine into which has been forced twenty-two pounds of creo-resinate mixture to the cubic foot. The wood was laid so that the grain was vertical and thus presents the ends to the wear of traffic. There is no possibility of the wood splintering under the horses' hoofs. The blocks, as may be seen from the illustration, present a perfectly smooth surface. They are not slippery, however, as may be judged from the fact that a heavy fire truck, located some distance up the street, always takes this block when responding to an alarm in the neighborhood, when previously to the laying of the block it turned down to a street laid with granite and did not pass over this block at all. The grade of this block is about 3 per cent., but many of the heavy trucks coming up from the ferries now use this street, when formerly the granite pavement on the other street was chosen.

The wood, of course makes the pavement noiseless and the fact that it is infiltrated with the creo-resinate mixture renders it perfectly sanitary and water-proof. A well-laid concrete base, six inches in depth, forms as solid a base as can be secured.

When asked as to his opinion concerning this wood paving, Mr. George W. Tillson, Chief Engineer of Highways of the Borough of Brooklyn, said that thus far he had heard no complaints about the pavement, but that the time was yet too short since it was laid for

him to speak definitely about it. Unless, however, bad symptoms arose in the future, he considered that it was all that its makers claimed for it. The pavement was laid in mid-summer, and when the accompanying photograph was taken of it it had just experienced a severe snow storm and period of freezing weather, and no untoward symptoms had developed or were likely to do so. A further advantage that this pavement has over asphalt is the fact that it may be taken up in places when necessary to repair pipes and the original pavement relaid without causing the ugly patches and holes seen when asphalt pavements are patched.

Brockton Lays Bituminous Macadam

GREAT satisfaction has been given by the stretches of bituminous macadam laid in the city of Brockton, Mass., as may be judged from the following statements taken from the annual report of Superintendent W. R. Keith of the Street Department:

"In the fall of last year, the street department laid about 300 yards of Warren Brothers' patent bituminous macadam. This was divided into four sections—one in East Elm street and the remainder in three different locations on Main street. The result has been even more favorable than was anticipated. This year there have been laid on North Main and Crescent streets nearly 20,000 yards additional, which is in every respect a fine example of smooth pavement, with the exception of where it joins the rails. The latter being of the T pattern, and but five inches in depth, does not leave room for a row of paving above the ties next the rails necessitating the laying of the macadam next the rail itself. Of these streets the street railway company rebuilt the track immediately before the macadam was laid. There is considerable more than the usual vibration to the rails which is enough to cause loosening of the macadam from the rail.

"Repairs have been attempted, but the pavement will have to be left until next season before anything to remedy the difficulty can be done, and then the street railway company will have to find some means of repairing the tracks to prevent such an unusual vibration of the rails before the street department can make successful repairs. This difficulty can be easily avoided in the future and need not prevent the laying of bituminous macadam next the railway track; in fact the sections laid last year, with a row of paving blocks next the rail have shown no signs of loosening."

The failure of the pavement next to the rails does not cast any reflections upon it as a durable material because this character of rail always causes such an amount of vibration that it would be impossible to maintain the surface of any smooth pavement next to the rail unless protected by heavy granite block. If, as should be the case, the railway were compelled to lay the modern grooved rail, there would be no occasion to protect the macadam, but it could be laid flush with the rail itself.

Superintendent Keith advocates the turning of the paving blocks on Montello and Main streets and the covering of the street with the bituminous macadam. He says: "There seems to be a demand for smooth paving through the business center."

Washington Leads in Street Cleaning

To the careful observer who is familiar with street conditions in the leading cities of the United States, there is no doubt that Washington is the cleanest city in the United States. This is made possible for two reasons: First, because the department is managed on a strictly non-partisan and merit-system basis; second, because it has the best equipment that money will buy. Warner Stutler, the Superintendent of the Street Cleaning Department, of Washington, possesses many of the traits of the late Colonel Waring, which has enabled him to bring the conditions in Washington up to its present high standard. Not the least in importance of these qualifications is the one inducing him to try every new device for street cleansing, which gives a reasonable assurance of efficiency.

Something over a year ago he tried a "pick-up" hand street sweeper and was so pleased with the test that he entered into a contract with the manufacturers to supply one hundred and thirty sweepers at $6.25 a month, the manufacturer to keep the same in perfect repair

THE HAND PICK-UP SWEEPER AT WORK *

during the year, the sweepers to become the property of the city at the end of twelve months. "By the use of these sweepers," he said, "the laborers can clean one-third more area than they could with the hand brooms and at the same time do the work better. The further reduction in the cost of the work on account of the use of the hand machine, which amounts to $90 per day, or $24,300 per annum, has enabled us to enlarge the daily area by adding thereto 500,000 square yards, thus making the daily hand cleaning schedule for the current year 2,000,000 square yards."

In referring to the work of this machine, which is shown in the accompanying illustrations, Mr. Stutler said: "Previous to the adoption and use of these machines 210 men, with hand brooms, cleaned a daily area of 1,565,809 square yards, making a total area during the year of 413,765,028 square yards at a cost of $76,439.47; whereas the same force, using the machines, cleaned 1,920,417 square yards per day, or a total of 515,992,920 square yards during the year at a cost of $79,704.46. It will therefore be seen that 354.608 square yards more per day were cleaned during the past fiscal year than during the previous year, making a total increase in area cleaned of 102,227,892 square yards at the comparatively small cost of $3,264.99; whereas under the hand broom method this increase in area would have cost us $18,912.

"During the year 1901 the cost per 1,000 square yards was 18.6 cents and during the past year this rate was reduced to 15.8 cents, which includes, for wear and tear, one-fifth of the cost of the one hundred and thirty sweepers, due entirely to the adoption of these machines.

"The daily area cleaned, therefore, was not only enlarged and the expenses reduced, but the streets were kept cleaner than ever before.

"During the current year a further reduction in the cost will be shown for the reason that the one hundred and thirty machines now belong to the District, which will mean a saving of $9,556.25 previously paid for rental less the necessary cost of maintaining and repair. It is believed that by the end of the present fiscal year it will be shown that the cost per 1,000 square yards for hand cleaning will be less than 15 cents."

It is evident from the foregoing account given by Mr. Stutler that without these machines he would not be able to cover as much

* This is manufactured by The Sanitary Street Sweeping Co., 116-118 G St., N. E., Washington, D. C.

DUMPING THE SWEEPINGS

area nor keep it as clean at so slight an expense. And it is also evident that not only the cities, but small towns which have smooth pavements, could adopt this method in keeping streets clean. One of the greatest needs of American cities to-day is streets thoroughly cleansed. The use of this machine affords the means for achieving the desired end.

Knoxville's Fight with Water Company

MAYOR J. T. MCTEER, of Knoxville, Tenn., announces that he will leave no stone unturned whereby he may facilitate in a legitimate way the winning of the city's suit against the Knoxville Water Company, in the matter of lower water rates for consumers. The Mayor announces that he has practically secured the services of an expert engineer, one who is thoroughly conversant with water works construction, expenses, etc., to come here and examine the local plant and testify before the special master, Henry O. Ewing, of Chattanooga. The expert is expected to arrive here to-morrow morning for a conference with the mayor and the city's counsel, Gen. G. W. Pickle and W. R. Turner, when it is expected a contract will be entered into relative to his services in behalf of the city. The Mayor prefers not to give out the engineer's name, but it is said he is a Nashville man.

Special Master Ewing has for several weeks past been taking evidence from the water company's witnesses as to the value of the plant, cost of construction, maintenance, etc., and also as to rates charged here and elsewhere. It is said the city's attorneys have prepared a very strong case and will introduce some evidence that the water company can not successfully combat and that will, it is thought, win the suit for the city. The attorneys will give out nothing at present as to their plans further than above stated.

The city of Knoxville passed a water rate ordinance, cutting the water company's scale. The city claimed this right under the contract with the company, and the latter corporation has sought to contest that right. The company made a compromise proposition, but it was refused by the city council, and now the case is in the Federal Court for adjudication. It is likely to go through the United States Supreme Court before a final decision. In many respects the local case resembles that of the city of Chattanooga against the water company at that place, involving the question of water rates.

Charges for Water in Cities

IN the following table will be found the water rates, both flat and meter, that are in force in nfty cities in the United States. As the charges for one tap are so varied in the different cities and based on widely different schedules, it was impossible to indicate all the rates, but the lowest rate for which water can be obtained is given in the first column after population. As may be seen from the table, in some cases, there are no flat rates, all services being metered, while in others the minimum flat rate includes other water fixtures besides taps. Under the meter rates is given the minimum annual charge at which water can be obtained by meter. The maximum and minimum charges for water by the 1,000 gallons are given in the other columns. These rates depend on the quantity of water consumed, the larger the amount of water the lower the rate per 1,000 gallons. Until there is some uniformity in the methods for charging for water in cities, no strict comparison of rates can be made.

		Flat Rates.					Meter Rates.		
	Population, 1900.	Minimum annual charge for one tap, $.	Closet per yr., $.	Bath per yr., $.	Stable per yr., $.	Hose per yr., $.	Minimum annual charge, $.	Per 1,000 gallons. Max.	Per 1,000 gallons. Min.
Albany, N. Y.	94,151	*6				5	*6	$.08	
Allegheny, Pa.	129,896	†2.50	2	2		1-12		.10	
Atlanta, Ga.	89,872						9.60	.13	$.10
Binghamton, N. Y.	39,647	‡4	3	3	4	3		.20	.05
Brockton, Mass.	40,063	5	4	4	4	6-10	8	.30	.20
Cambridge, Mass.	91,886	4	3	4	4	5	5	.20	.10
Camden, N. J.	75,935	§5	3	3	1	3-5	10	.10	.06
Charleston, S. C.	55,807	8	8-2	8-4	5	3-5		.25	.075
Cincinnati, O.	325,902	†3	1.50	2.70		½c. y		.10	.08
Columbus, O.	125,560	‡5	4	5	1.50	6			
Dayton, O.	85,333	†4	2.50	2	2.50	3	6	.08	.06
z Denver, Colo.	133,859	†3.15	4	4	2.15	.11 ft	3	.17	.10
Duluth, Minn.	52,969	†6	3	3	2	1c. y	6	.33	.066
Erie, Pa.	52,733	‡4	3	3	2	5-3	4	.20	.04
Fall River, Mass.	104,863	5	5	5	4	6-10		.28	.10
Gloversville, N. Y.	18,349	‡4	2	2	3	3		.21	.035
Grand Rapids, Mich.	87,565	§4	§4	§2	2	3-10	5	.066	.053
Hartford, Conn.	79,850	§5	§3	1		3		.16	.08
Harrisburg, Pa.	50,107	¶8	3	4	1			.13	
Holyoke, Mass.	45,712	‡4	2.40	2.40	1.60	2.40		.15	.05
Indianapolis, Ind.	169,104	†3 z	3	3	5	4	16.20	.18	.07
Johnstown, N. Y.	10,130	‡4	2	2.50	2	2	6	.20	.06
Lawrence, Mass.	62.559	§5	4	3	2.50		7	.20	.08
Lowell, Mass.	94,969	§6	4	3	4	3	7	.186	.13
Lynn, Mass.	68,513	‡5	3	3	4	4	10	.20	
Madison, Wis.	19,164						4.50	.26	.066
Manchester, N. H.	56,987	‡4.50	2.50	2	1.50	2-12	10	.166	
Middletown, N. Y.	14,522	‡4.50	1.50	1.50	2	2.50	9	.20	.053
Nashville, Tenn.	80,865	†6	5	4		3c. y	8	.20	.08
New Bedford, Mass.	62,442	2.50	2.50	2.50	2	2.50	5	.15	
Norfolk, Va.	46,624	†6	5	3	1.50		10	.40	.10
Peoria, Ill.	56,100	†4 z	3	3	2			.20	.06
Providence, R. I.	175,597	6	5	5	4	5	10	.20	.15
Reading, Pa.	78,961	‡4.50	2	2.50		4		.40	.029
Richmond, Va.	85,050	‡4	3	3.50				.15	.05
Rochester, N. Y.	162,608	t4	2	2		m	5	c.14	.10
St. Paul, Minn.	163.065	†3	2	2	2	1.50	12	.13	.065
Salt Lake City, U.	53,531	†4	2	1	1	1.50	4.20	.10	.035
Seattle, Wash.	80,671	§7.60	2.40	2.40	2.40	4.80	24	.33	.08
Springfield, Mass.	62,059	‡8	4	4	4	5-8	10	.29	.065
Springfield, O.	38,253	†4	2.50	2.50	2	5	10	.10	
Somerville, Mass.	61,643	t5	5		1.25	3	15	.186	.105
Steubenville, O.	14,349	†2	4	2	1	3	10	.50	.05
Syracuse, N. Y.	108,374	‡5	5	4	3	6-10	5	.186	.046
Toledo, O.	131,822	5	3	3	3	1-6	6	.10	.035
Trenton, N. J.	73,307	‡4	1	3	3			.40	
Utica, N. Y.	56,383	z					5	.30	.20
Wilmington, Del.	76,508	‡5	2	3	3	5	10	.10	.05
Worcester, Mass.	118,421	§6	4	5	3	4-5		.25	.15
Yonkers, N. Y.	47,931						4	.20	

* Depending on width and height of house; from 20 ft., one story at $6, to 50 ft., five stories at $31.50. † According to the number of rooms; extra charge is made per room over the number allowed in minimum charge. ‡ Per family of various numbers, running from two in some cities to six in others. z Private company. § According to limited number of persons; extra charges made for additional persons using fixture. ¶ According to whether on street or avenue, or two or three stories. t Per assessed valuation. In Rochester pays for $1,500 value; $7.50 for $18,000, 50 cents for every $4,000 over $18,000. In Somerville, Mass., up to $1,000; for each $1,000 over, $1. m Metered. c Hemlock Lake water. The other rate is for Genessee river water. y Square yard. Manufacturers' rates per 1,000 gal. are allowed in several cities in the list. In Atlanta it is 13 cts.; Brockton, 25 to 15 cts., aeccording to quantity; Harrisburg, 8 to 2¼ cts.; Lynn, 20 cts.; Middletown, 2½ cts.; New Bedford, 2½ cts.; Seattle, 9½ to 5 cts.; Trenton, 12 to 8 cts.; Yonkers, 16 to 6½ cts.

A Ballad of Bad Cities

Come, Cincinnati, rise and say
That you are but a mire of sin;
And Memphis, with your turrets gray,
Get up and make reform within;
Chicago, of the awful din,
And you, Spokane, in frost-work clad,
Forget not when the yarn you spin—
There's many another just as bad.

O Richmond! Gird unto the fray;
And, Boston, show your cloven fin;
And you, Des Moines, of Ioway,
Blow out your shame on horn of tin;
New Haven, reach and stick a pin
Upon the map of old Bagdad;
And, Mobile, look with pious grin—
There's many another just as bad.

Make haste, O Nashville! Haste to-day;
Repentance, you, Detroit begin;
And San Francisco on the bay
Retire at once from ale and gin;
And Baton Rouge, strive yet to win
A color that is good and glad;
But ponder, ere the night set in—
There's many another just as bad.

ENVOI

Prince, of the cities grave and gay
Sing this refrain when you are sad,
Here in New York, or on your way—
"There's many another just as bad!"

J. J. M., in *Puck*.

♣

Atlantic City's Water Works

THE installation of water meters postponed for some years the laying of a new thirty inch main to supply Atlantic City, N. J. The rapid growth of the city makes necessary a great increase in the supply. The water saved by the meters is needed for the new comers. The increased consumption will necessitate a new driven well, a suction well, repairs to the flume, etc. To maintain the purity of the water it will be necessary for the city to purchase the whole or greater part of the water shed or else construct a filtration plant. The pumping engines have been enlarged during the past year. Records show that while the city increased in size 75 per cent. since the water works were purchased by the city, the pumpage for 1901 was 36 per cent. less than for the first year after the city purchased the plant. During 1900-1901 the pumpage amounted to 1,094,651,552 gallons with a consumption of coal of 3,401,615 pounds, the population of the city being about 250,000 during the visiting season.

The city owns two water works systems, the Wood, built in 1882, and the Consumers in 1888. The former is supplied from the mainland from about fifty-four driven wells four inches in diameter and from a creek; the latter consists of five driven wells about 800 feet deep. The cost of pumping 1,000,000 gallons by the Wood system amounted to $8.81, and by the Consumers $31.19. The total cost of pumping, figured on total maintenance, amounted to an average in both plants of $30.99 and the total cost of pumping based on total expenditures—including interest, maintenance and sinking fund—reached the sum of $102,857.72. For the year 1901 the receipts for water rates amounted to $94,327.72. The total receipts were $142,824.07 and the expenditures $133,127.14. Up to the present time the net cost of the works figures up $1,110,722.01. The average daily consumption per capita in summer is thirty-five and in winter seventy-five gallons. The new thirty-inch steel riveted force main has recently been completed. The plans were made by Superintendent W. C. Hawley and Mr. Emil Kuichling, Engineering Editor, THE MUNICIPAL JOURNAL, was retained as consulting engineer.

Statistics of Arc Lighting in United States Cities and Towns

	Population.	No. lamps. Open.	No. lamps. Closed.	Watts at lamp terminals. Open.	Watts at lamp terminals. Closed.	Schedule.	Hours per year.	Coal per ton.	Contract price per lamp per year.
ALABAMA									
Birmingham z	38,415	570	353	480	...	(1)	3,044	$1.32½	.....
Eufaula	4,532	40	4	340	...	(1)	4,500	2.95	$67.57
Gadsden	4,282	50	12	480	...	(1)	4,000	1.75	84.00
Huntsville	8,068	74	...	480	...	(1)	4,000	2.00	90.00
Mobile	38,469	138	70	480	480	(1)	4,000	3.15	88.00
Montgomery	30,346	50 300	75	340	430	(1)	4,000	2.30	74.00 88.00
New Decatur	4,437	28	...	340	...	(1)	4,000	2.10	90.00
Selma	8,713	90	...	480	...	(2)	2,179	2.50	90.00
ARIZONA									
Mesa	722	...	9	...	...	...	3,000	6.00	120.00
Nogales	1,761	...	12	...	550	(1)	4,000	Wood	120.00
Phoenix	5,544	55	...	340	...	(2)	2,200	5.00	96.00
Tucson	7,531	...	30	...	550	(2)	2,179	9.00	.....
ARKANSAS									
Camden	2,840	16	...	340	...	(1)	4,000	2.70	144.00
Fort Smith	11,587	100	...	480	...	(2)	2,179	1.06	80.00
Harrison	1,551	...	9	...	430	(2)	2,179	2.20	100.00
Helena	5,550	...	26	...	430	(2)	2,179	2.25	120.00
Jonesboro	4,508	34	...	340	...	(2)	2,179	2.75	120.00
Malvern	1,582	25	1	340	...	(2)	2,179	4.00	90.00
Mammoth Spg.	717	5	1	480	...	(2)	2,500	W. P.	60.00
Newport	2,866	...	30	...	430	(2)	2,301	3.00	120.00
Pine Bluff	11,496	7	...	480	...	(1)	4,000	2.25	180.00
Stuttgart	1,258	...	5	...	550	(3)	1,825	3.20	96.00
Texarkana	4,914	...	10	...	430	(1)	4,000	2.25	120.00
CALIFORNIA									
Anaheim z	1,456	24	...	480	...	(2)(3)	1,220	Oil	.....
Bakersfield	4,836	...	50	...	430	(2)	2,161	W. P.	96.00
Benicia	2,751	15	...	480	...	(2)(4)	1,550	8.00	126.00
Berkeley	13,214	112	...	480	...	(2)(4)	1,434	(5)	90.00
Colton z	1,285	...	12	...	430	(2)	1,135	(5)	.....
Eureka	7,327	67	...	480	...	(1)	4,000	Wood	96.00
Fresno	12,470	126	65	...	430	(1)	4,000	W. P.	108.00
Hanford	2,929	...	20	...	550	(1)(2)	2,179	.....	96.00
Healdsburg	1,869	...	32	...	430	(1)	4,000	W. P.	84.00
Hollister	1,315	21	...	340	...	(2)	2,179	Oil	96.00
Livermore	1,493	21	...	480	...	(2)(3)	1,625	Oil	120.00
Los Angeles	102,479	... ...	824 837 70 ...	... ...	430	(4) (1) (1) (1)	2,400 4,000 3,762 ...	Oil Oil Oil ...	108.00 88.20 88.20 ...
Martinez	1,380	...	9	...	430	(4)	2,190	6.00	90.00
Marysville	3,497	...	38	...	430	(1)	4,000	W. P.	83.20
Napa	4,036	...	...	...	...	(2)(4)	1,550	8.50	120.00
Oakland	66,960	580	100	480	480	...	2,800	6.25	105.00
Pasadena	9,117	50	50	...	430	(1)(2)	2,179	W. P.	78.00
Petaluma	3,871	37	...	480	...	(2)	2,179	6.00	102.00
Pomona	5,526	...	25	...	430	(1)(2)	....	W. P.	78.00
Red Bluff	2,750	...	26	...	550	(2)	1,280	Wd. Oil	72.00
Redwood City	1,653	...	50	...	430	(3)	1,500	6.35	60.00
Sacramento	29,282	350	...	480	...	(1)	3,726	W. P.	100.80
Salinas City	3,304	32	14	480	550	(2)(3)	2,190	10.75	72.00
San Bernardino	6,150	100	...	480	...	(1)	4,000	W. P.	78.00
San Diego	17,700	157	...	480	...	(2)	2,036	8.75	120.00
San Jose	21,500	150	10	480	...	(2)(3)	2,160	Oil	42.00
Obispo	3,021	18	...	340	...	(2)	2,179	Wood	84.00
		15	...	480	...	(2)(3)	....	W. P.	72.00
Santa Ana	4,933	12	...			(2)(3)	1,220	.....	72.00
Santa Cruz z	5,659	83	...	340	...	(2)(3)	1,440	Wood	.....
Santa Monica	3,057	...	50	...	480	(4)	2,400	Oil	96.00
Santa Rosa	6,673	50	...	480	...	(2)	2,179	9.25	66.00
Stockton	17,506	200	3	480	...	(2)	2,179	6.25	106.80
Vallejo	7,965	66	...	340	...	(2)	2,179	6.75	40-120 26-117
Ventura	2,470	20	...	340	...	(2)(3)	1,220	W. P.	90.00
Visalia	3,085	25	8	340	430	(1)	4,000	W. P.	90.00
Watsonville	3,528	24	...	480	...	(2)(3)	1,200	Wood	90.00
COLORADO									
Aspen	3,303	55	1	480	...	(1)	4,000	W. P.	90.00
Boulder	6,150	49	...	480	...	(1)	3,800	1.40	96.00
Canyon City	3,775	30	...	480	...	(1)	4,000	2.00	132.00
Crested Butte		...	4	...	...	...	2,889	W. P.	100.00
Cripple Creek	988	133	...	480	...	(1)	4,000	(5)	162.00
Del Norte z	705	10	...	480	...	(2)(3)	1,220	2.45	.....
Denver	133,859	33 1,000	...	480	...	(1)	4,000 3,825	2.20 2.50	90.00 90.00
Durango	3,317	26	...	480	...	(2)	2,112	1.25	120.00
Florence	3,728	...	30	...	550	(1)	4,000	2.25	96.00
Ft. Collins	3,053	42	10	480	430	(4)	2,555	2.10	100.00
Georgetown	1,418	...	4	...	430	(2)	2,179	4.25	120.00
Glenwood Spgs.	1,350	12	...	480	...	(1)	4,000	W. P.	144.00
Golden	2,152	...	6	...	550	(2)(3)	1,220	2.00	76.00
Lamar	987	2	1	...	...	(2)(3)	2,179	3.25	132.00
Leadville	12,455	64	...	480	...	(1)	4,000	2.75	100.00
Longmount	2,201	14	...	480	...	...	2,000	1.40	108.00
Manitou	1,303	18	...	480	...	(2)(4)	1,550	2.05	132.50
Montrose	1,217	14	...	...	430	...	2 160	3.25	132.00
Pueblo	28,157	200	...	480	...	(1)	4,000	1.75	105.00
Salida	3,722	20	...	480	...	(1)	4,000	4.35	150.00
Telluride	2,446	...	8	...	430	(1)	3,600	W. P.	72.00
Trinidad	5,345	64	...	480	...	(1)(2) (2)(3)	2,179	.80	96.00 64.80

(1) All night. (2) Moon scale. (3) Midnight. (4) After midnight up to 1 or 2 P. M. The difference in time may be judged from the column showing number of hours lamps burn. (5) Rent power. z Municipal plant.

The data given in the above table were collected by the General Electric Company, Schenectady, N. Y.

PROPOSED REGULATIONS FOR SAVANNAH

AMONG the provisions of an ordinance submitted to the Council of Savannah, Ga., it appears that the Superintendent of the Fire Department is to be elected by the Council every two years, the other members of the Department, including the Assistant Superintendent, to be appointed by the Mayor. The Superintendent of the Department is to receive a salary of $2,000 a year and his assistant one of $1,350. The Electrician of the Department will be paid $1,200 a year, half of which is to come from the Fire Department and half from the Police. Captains will receive $840; lieutenants, $720; engineers, $1,000. The pay of the regular firemen shall be $50 a month for the first year's service; the second year they are to receive $55 a month, and $60 a month thereafter. The members shall be liable to removal by the Mayor, with or without cause assigned, upon recommendation of the Superintendent, but the Superintendent and his Assistant are not so liable. All officers and men upon entering the department will be required to give a bond with two securities, approved by the Clerk of the Council, for the faithful discharge of their duties. These bonds will run from $3,000 for the Superintendent, down to $100 for the regular firemen.

It shall be one of the duties of the Superintendent to make a daily report to the Mayor on the condition of the houses and apparatus and each captain will be required to report to the Superintendent about his respective company. It shall be one of the duties of the Assistant Superintendent to inspect all buildings within the city while they are in course of construction or being remodeled, and he shall have the power to stop all work not done in accordance with the ordinances of the city or in violation of the fire regulations or building laws.

After any fireman has served between twenty and thirty years in the service, if the Health Officer of the city and the Council agree that such member is permanently injured so as to be unfit for duty, he shall be placed on the retired roll and receive an annual pension of one-third of his regular salary. For all members who have served thirty years or more, the pension shall be not less than one-half of his full salary. If any member dies in service, from natural causes, he shall be buried at the expense of the city, and his family shall receive his monthly salary for three months after his death.

The Superintendent or his Assistant shall have the power, with the consent of the Mayor, to order any person to pull down or blow up any house in order to prevent further spread of any fire. For the refusal of any person to obey such orders, he shall be subject to a fine and imprisonment. Another provision of this ordinance is that no street car, or other company, or any person shall use a rotary gong upon any vehicle in the city.

COLLECTION AND DISPOSAL OF REFUSE IN ENGLISH CITIES

			Collection.						Disposal.						By Pumping.		
	Population.	Area in acres.	No men.	No carts.	Between what hours.	No. loads per day.	Wt. per load.	Cost per load.	Daily quantity per cell of destructor.	Cost per ton.	Per cent. residue.	Residue disposal.	Use of steam generated.	No. cells of destructor.	No. boilers.	No. dumps.	Dist. from centre city, miles.	How conveyed.
Ashton Manor	80,000	934	40	20	Y 6—6 a; n 10—6 p	90t	2,200	$.58	10t	$.25	30	m or d	cl	12	3			
Barrow-in-Furness	57,589	10,000	21	12	Y 6—5:30 a	40	3,000	.81								6	3	c
Battersea	168,896	2,156	71	54	X 8—4:30 a	99	2,000		†32		1-3	m	ch	6	1			b
Bermondsey	130,450	1,600	24	16	Z 6—5:30 a	80	4,000	.87	10t	1.10	35	mb	cl	6	3			
Birkenhead	110,926	3,850	52	22	X a; M k p			.67		.37	30	m & d	r	24	2			
Birmingham	523,284	12,705	290	175	Y 6:30—5:30 a; 9:30—6 p	665			10t	.18	30	g		63	20			
Blackburn	130,000		93	60	Y 6:30—5:30 a	5	2,200	.52	†10t	.20		r s	r el	18	5	2	1	c
Bootle	58,566	1,590	57	22	Y 6—5:30 a; k 7—5 a	96	2,400		6t	.23	30	r g	r	12	1			
Bournemouth	60,000	5,850	30	30	Z all	60	2,500		†5t	.18	25	g		6				c
Bradford	280,000	22,841	128	60	Y 9—7:30 p; 7—5 a	400	2,000	.50	†10t	.15	30	r d	el r	35	5	12	1	c
Brighton	123,691	2,620	64	40	Y 6—5 a	90	2,100	1.00	7t	.56	33	g r	r	12	2			
Bristol	334,632	11,570	74	64	Z 7—5 a	198	2,800	1.02	†6¾t	.23	29½	g r	r ch	16	1	13	1	c
Burton-on-Trent	51,000	4,025	20	12	X 7—5 a; 5:30—9 p	30	2,700	1.00		.45	33		r ch	5	1	6	1¼	c
Camberwell	233,706	4,480	100	68	X 7—5 a	165	2,000	1.25								10	2	b v
Chelsea	73,842	659	40	20	X 6:30—5:30 a	85	1,600	.85										b
Coventry	70,000	4,147	74	16	Y k n p	59	2,600	.62								4	1¼	c
Croyden	137,917	9,014	94	47	Y 7:30—5 a	2½	2,000									6	1½	c
Derby	116,869	5,260	41	25	X 7—5 a	73	2,100		9t		76		h	12	1			
Devonport	70,437	3,176	48	24	Z 7—5 a	98	1,200	1.25										b
Dublin	289,000	7,894	143	62	Y 8—9 a	270	2,000	.83	†5t	.25	33	g		4		25		c b
East Ham	100,000	3,320	27	18	X 7—5 a	52	2,700	.92									2	c
Edinburgh	318,507	11,415	439	174	Y 6—9:30 a	660	2,000		†6t	.61	25	g	cl r	10	1	3	9	c v
Finsbury	101,576	555	40	20	Y 8—10 a	80	2,500	.84	9½t	.18	33 1-3	b	el	6	1			
Fulham	137,289	1,700	42	24	Y 7—5 a	70	2,800	1.87	8t		37	b	el	12	6			
Gateshead	109,000	3,100	43	34	Y 8—10 a; X n 10—7 p	180	3,400	.66									1	c
Glasgow*	765,000	12,688			Y 10 p; 9:30 a	650	2,000	.64	†	.25	30	g d					12	
Great Grimsby	63,138	3,120	45	26	X k 6—5 a; n 11—8 p	27				Building						2	2	c
Halifax	105,000	13,364	80	44	Y 7—5 a; n 4—8 a m	70	1,500									3	1½	c
Hammersmith	110,076	2,282	48	24	X 6—6 a	108	1,700	1.47								2	1	b c
Handsworth	52,921	3,647	30	15	X 6—5 a	55	2,300	.83	11t	.20	23	g	f	8	2			
Hanley	61,524	1,768	18	18	Y k 7—5:30 a; n 11—6 p	75	2,200	.66		Building						6	1	c
Holborn	61,033	405	80		Z 6—5 a	44												b
Huddersfield	95,420	11,854	131	52	Y 6:30—4 a	5½	1,875	.66	†7t	.36	40	r	r	10	1	10	1½	c
Hull	240,000	9,202	54	29	Z	3	2,000	.93	10t	.31	33	g	f el	18	2			
Ipswich	64,600	8,395	12	12	Y 7—5 a	24	1,500	1.18								1	½	c
Islington	335,000	3,092	126	49	X 7:30; 5—7 p. m.	123	3,200	2.09										b v
King's Norton & Northfield	61,000	23,000	28	12	Y 7—5 a; 10—6 p	40	2,500	.93									1½	c
Leeds	430,489	21,572	700	300	Y 10—3 a	720	2,000	.62	†6½t	.25	33	g	r	50	5	100	1	c
Leicester	216,000	8,586	120	40	X 7—4:30 a	166	2,000	.93	8t	.50	33 1-3	r s	r el	24	5			
Manchester	549,169	12,911	723	295	Y 8—7 p ‖				†12t	.31	25	r g	r m	33	15	4		b c
Merthyr Tydfil	69,225	17,759			Y 7—5 a	150	1,800	.39								7	1	c
Middlesbrough	92,500	2,824	71	33	Y 6—5 a; k n 11—7 p	110	2,000											b v
Newcastle-on-Tyne	219,000	5,371	120	59	Z 8—6 a	260	2,600	1.12	†8t	.16	30	d		12	3	5		c b v
Newport (Mon.)	70,000	4,924			Y To 9 a. m.	55	2,800	.62								6		c
Northampton	87,021	3,541	24	13	Z 7—4 a	74	2,600	.43								3	1¼	c
Norwich	112,000	7,000	100		X Z 7 a. m.; 4 p. m.	4	2,000	.62	†15t		28	g	m	2	1		1½	c
Nottingham	239,753	10,935	300	80	X 7—5:30 a; n 9—6 p	7			†			g	m	5	1			b
Oldham	138,091	4,729	59	32	X Z 7—5:30 a	150	2,300	.56	†8t	.20	33	s	r ch	26	6	4	1¼	c
Paddington	143,976	1,354	48	24	X 5 a. m.; 7 p. m.	90	2,300	1.12										b

t Ton. † Partial Disposal by destructor. d Dumped. m Manufactured. el Electricity c Carts. X Weekly. Z Bi-weekly. Y Daily. M Monthly. ch Crusher. b Barged. s Bacteria beds. r Mortar grinding. g Roadmaking, concrte, etc. h Heating. f Fan for forced draught. n Noitsoil. k Ashpits. v By rail. a During daytime. p During night time. * The refuse is separated, mixed and prepared for manure, and the unmanurial portion cremated.

FIRE DEPARTMENT OF SCHENECTADY

Partly Paid, Partly Volunteer Force—Growth of City Makes Necessary Increase in Apparatus—Drill School for Regulars and Volunteers

By Our Special Correspondent

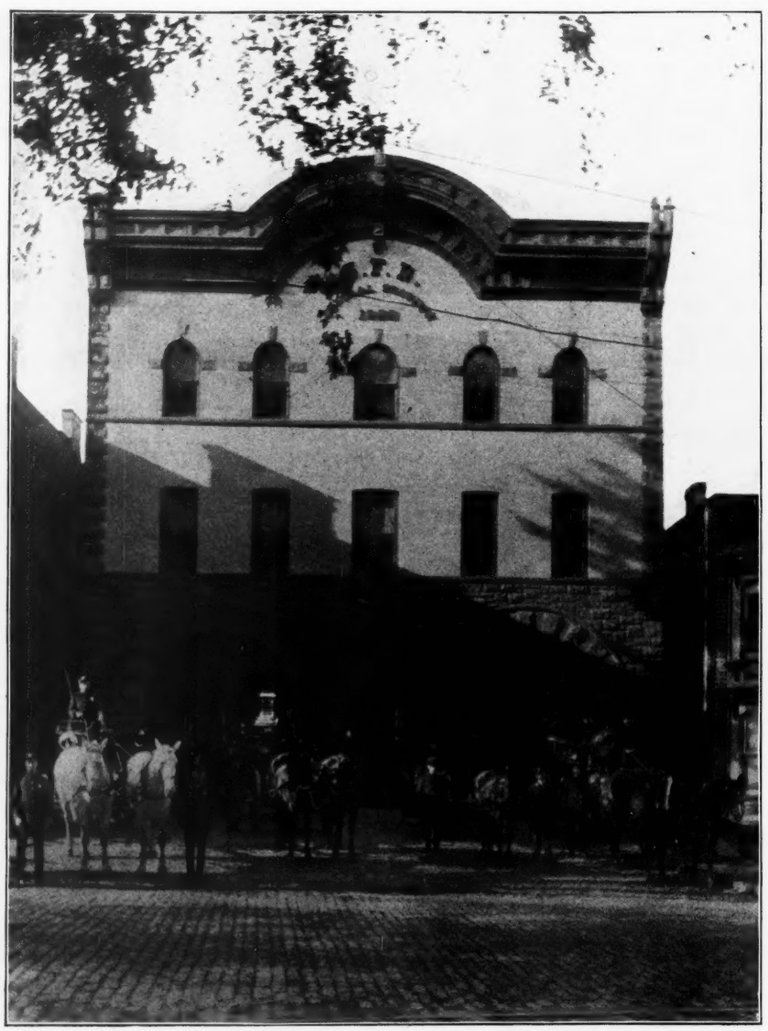
THE city of Schenectady, N. Y., has had a remarkable growth within the last decade. A city with a population of 19,902 in 1890, the census of 1900 found it grown to 31,682. The great expansion of the works of the General Electric Company is mainly responsible for the corresponding increase in the general population of the city because of the number of the employees of the company that have made the city their home, building or renting cottages in its outskirts. The other large manufacturing works, such as the Schenectady Locomotive Works, have gradually drawn to the city as permanent residents many of their workmen and the steady growth of the city has been assured. The increase in population shown above does not tell the story of the growth in area which is of great importance in considering the efficiency of the fire department of any city. Schenectady has its crowded sections, but is suburbs are extensive in proportion to the more compact part of the city and these outlying districts have to receive the same protection from fire that is accorded the city proper.

REORGANIZATION OF DEPARTMENT

The Fire Department of the city of Schenectady was reorganized in May, 1899, and in September of the same year a Board of Fire Commissioners was appointed. A thorough renovation of the department was undertaken and it was placed on a thoroughly up-to-date base. The fire companies are located in and about the thickly populated portions of the city where the greater number of fires are liable to occur and so that they will be in reach of the large manufacturing plants, but the time is not far distant when it will be necessary to place additional companies in the newer portions of the resident districts.

THE CENTRAL STATION

The central station is the largest of any in the department and is about as complete a station as a city of the size of Schenectady could desire. Like the other houses in the service, it is kept in first class condition and always ready for inspection. This building is 55 feet by 120 and three stories high. On the ground floor are installed four pieces of apparatus and seven horses. On the ground floor are bunker room for the men, which will accommodate fourteen. There are also rooms for the commissioners, the private room and bath of Chief Yates; on the third floor are the parlors and quarters for the call men for the combination wagon and for the hook and ladder truck. In the rear of the building is an eighty-five foot iron bell tower and a small building used for a horse hospital and repair shop.



SCHENECTADY'S CENTRAL FIRE STATION

In the central station are located a combination hose and chemical company equipped with a combination wagon built by Holloway & Co., of Baltimore. It is a double 35-gallon cylinder wagon carrying 200 feet of chemical and 600 feet of rubber lined, wax treated hose, and is drawn by two horses. A Hayes aerial truck is located at this station and has a sixty-foot extension ladder, life net, a water tower attachment and all the smaller necessary appliances to make the apparatus complete. A steam fire engine company is stationed in this house and is equipped with an American engine of Clapp make, third class. The permanent men attached to the engine company consist of a driver, an engineer and two others. The truck company is composed of six paid men with a captain and two assistants of the volunteer service. There are thirty-four registered members altogether in this company. Thirty-one members are registered in the chemical company, three being paid and the foreman, two assistants and the rest volunteers. Chief Henry R. Yates has his headquarters in the central station and he is assisted in his duties by a first and second assistant chief engineer, who are volunteer men.

Located in different portions of the city are the other companies which are supplied with four hose wagons and a double tank chemical engine and a Lafrance second size steam engine. Each hose wagon is equipped with 1,000 feet of hose and is of Rumsey build. The membership in these companies ranges from thirty to thirty-three men, three or four in each company being paid men. The roster of the whole department consists of Chief Yates, two partially paid assistant chiefs, a paid superintendent of fire alarm, engineers of steamers, in all twenty-five paid men and two hundred and nineteen volunteer officers and men. All the permanent men were appointed through the rules of the State civil service. During the last month the Council passed an ordidinance appropriating the sum of $39,475 for the purpose of buying addi-

tional apparatus and supplies for the Fire Department. The need of more apparatus was urgent on account of the continued rapid growth of the city. To the East and South it is spreading out rapidly as the prosperity of the operatives in the many manufacturing interests increase. Among the many items to be obtained for the Department will be a $2,500 aerial truck, a combination wagon and chemical engine, two wagons and equipment, a storage battery, alarm boxes, and $4,000 worth of hose.

The Drill School

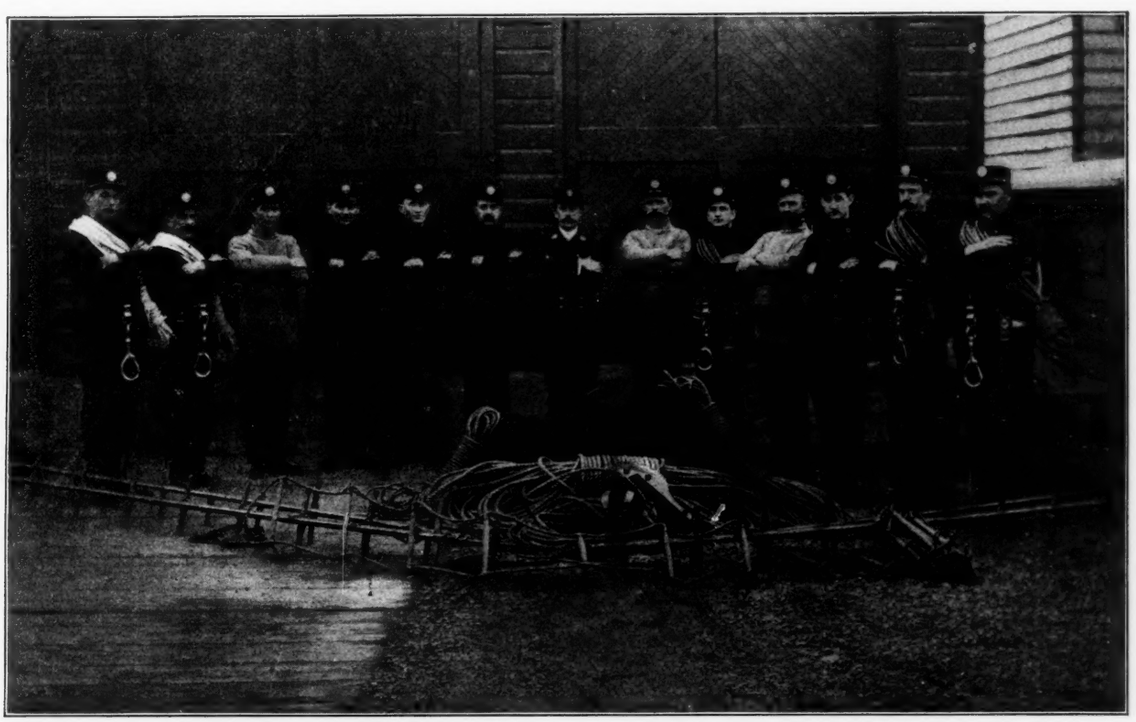
In the rear of the central station the hose tower has been put in such condition that instruction can be given the men in their duties. Four afternoons a week the paid men are trained in the use of the ladders, ropes, etc., and the last two days in the week any volunteers that so desire can receive instructions. The men work at this from two to four in the afternoon and are divided into four classes, one training each day. This life saving corps was formed in September, 1901, and suitable windows were cut in the back of the hose tower. Instructions are given in the use of the scaling ladders, new methods of raising hose to roofs, the proper way to slide down a rope, to rescue a person, and everything necessary for a trained fireman to know. In the estimation of Chief Yates a thorough knowledge of the use of the scaling ladders is as essential as the knowledge of the truck.

The paid men are instructed in "first aid to the injured" by a physician. Dr. A. G. Wicks delivers lectures in the commissioners' room at headquarters one evening in the week during the cool months to the men who form the ambulance corps. These lectures are very beneficial as it enables the men to care for the injured at fires before a regular physician can reach them.

Mr. James F. Burns has charge of the fire alarm telegraph and this has been in good condition since its installation. Eighteen inches on the tops of all telegraph poles is reserved by ordinance for the use of the fire alarm wires and no wires of any nature are allowed to cross a fire alarm wire unless a guard is placed under it. This prevents the possibility of the alarm wires being burned out. At headquarters a bell tower has been recently erected, and this is an important addition to the alarm service as the volunteers can be notified better by its use. About the streets are distributed thirty-one alarm boxes and there are nine indicators with bell attachments, a three circuit repeater, etc., under the fire alarm system.

The Water Supply

The city is provided with nearly six hundred fire hydrants and others are constantly being added as the needs of the service require. As auxiliaries to the water main service, there are nine fire cisterns which are kept filled and ready for use. As the city water department has always furnished an ample supply for any fire that has taken place, the cisterns have not been brought into use. In case a conflagration should start in the city, in addition to the regular water supply and the fire cisterns, the old pumping station located on the river bank, can be brought into service to increase the supply and pressure in the pipe lines. This station has been renovated and placed in such condition that the pumps can be started within a very short time after their need is seen.



CHIEF YATES AND HIS POMPIER CORPS

Besides his duties as chief engineer of the department, Chief Yates also performs those of fire marshall. He has visited all the hotels and buildings of three or more stories and found that few had proper provisions for the escape of the occupants in case of fire. Complaints have been made against these and it will be necessary for the owners to place fire escapes on them. During the coal strike the Chief issued notice that all property owners should take care to see that their chimneys were thoroughly cleaned and put in condition before cold weather set in. The Chief took this precaution because, on account of the scarcity of coal, it was likely that the citizens would burn a great deal of wood, and chimney fires were liable to occur much more often from a wood fire than from one of coal. The Chief warned the people also that if after three weeks from the date of this notice any chimney fires occur, which may be due to negligence in not carrying out his instructions, the owners of the premises in which the fire occurred, would be fined not less than five dollars nor more than twenty-five dollars, as permitted under the revised ordinances of the city.

THE FIRE BRIGADE OF CHRISTIANIA

By the Chief of the Department

THE professional fire brigade of Christiana, Norway, was organized in 1861, and is now a corps consisting of four chief officers, ten second officers, seven commanders of sub-stations, while three of this class are in service at the headquarters, in addition there are thirty sergeants, ninety-four firemen, three engineers for the steam fire engines, and one clerk of the stables.

Christiania had at the end of last year about 225,000 inhabitants, the town covering an area of 3,954 acres. The buildings are from one to five stories high and in general are not permitted to be built higher than eighteen metres, (54½ feet) from the ground, and in narrow streets less than this. Most of the houses are built of brick-stone,

SCANDINAVIAN FIREMEN AT WORK

with fire-proof walls between adjoining houses. A great deal of wood is used for panels, staircases, and lofts, which is often the cause of great damage by fire; many of the older houses have only one wooden staircase. The owner of the house must in such cases provide a number of approved fire escapes to every family above the first story, usually good ropes fastened to the wall at one of the windows. They are supervised once a year by the fire department.

The number of fire alarms are, in all, 157. Every station has its independent system of alarm boxes; all stations are, of course, in telegraphic and telephone connection with headquarters, and with the great central telephone.

The waterworks of Christiania are supplied from natural lakes, situated 595 feet and 486 feet above the level of the sea. The great pressure derived from this has to be divided and reduced by means of four reservoirs, situated at heights of 260 and 345 feet. In the most valuable parts of the town the pressure in the conduits is from five to eight atmospheres, and in some of the higher parts of the town less, but nowhere below two atmospheres. There is sufficient circulation and supply of water summer and winter.

Nearly at every street crossing, and where the blocks have long frontages, water-plugs for two hoses are placed. The fire engines are thus seldom in use, but are kept as a needed reserve. It is an advantage of great importance to find sufficient water and pressure anywhere.

On the fire map of Christiania there are shown the eight fire stations and their districts with fire alarms, and in the annual report there is also indicated in red numbers the crew, or the different strength of men. The men employed at the different stations are divided into three equal parts, thus: A1, A2, A3. Two parts must always be ready for service, first, day and night watch, A1 and A2; second, A2 and A3; third, A3 and A1, etc. One of the parts are free a day and a night, and may be in their homes. They have to do two hours' work and watch service at public performances each third day. Within the limits of their own district a fire is attended to by A1 and half of A2, the remainder being kept in reserve at the station. To an alarm in a neighboring district, only A1 will attend, while A2 is kept as reserve. At a large fire assistance is always obtained from at least four stations—the headquarters and the three nearest sub-stations; so there are usually four stations where the force is kept in reserve.

As an additional reserve, a corps of 200 communal men, engineers and workmen, is organized; these get some fire practice, and are available to be called at an hour's notice, and are occasionally paid by the fire department.

The cost of the fire department this year will amount to about 258,000 kronens ($69,660), inclusive of 12,000 kronens ($3,240), for the establishment of a new station (No. 8), in April last. All this is paid by the municipal street authorities.—[*The Street*, London.

A SQUAD OF DETROIT'S MOUNTED POLICE

GOOD BUILDINGS LESSEN FIRE RISK

Some valuable suggestions as to the prevention of fires by judicious building construction were thrown out by Mr. Ellis Marsland, of the British Fire Prevention Committee, in an address to the Society of Architects. Taking the great fire at Antwerp in June last and the more recent one in the Barbican, London, as his text, Mr. Marsland showed that the first important lesson taught was that every large business building should be divided into sections by division walls, the openings in which should be closed by efficient double iron doors, and that it should be furnished with fire appliances capable of reaching the top story.

In Germany any man is made personally liable if it is found after a fire that he has neglected any of the precautions which the law provides he must take against fire. Without going so far as that, we might, Mr. Marsland thinks, quite reasonably put further statutory obligations upon owners of buildings. For instance, under certain circumstances, it is at present compulsory to have fire resisting doors in party walls, but there is no obligation upon owners to see that they are closed before the premises are vacated. A penalty might be imposed in cases where such doors are left open at night.

With regard to the objection that increased expenditure on buildings with a view to fire protection results in increased assessment, Mr. Marsland contends that every owner who makes his property fire resisting renders a great sevice to the community, and should in consequence rather have his assessment reduced than increased. If municipalities would look at the matter in the right light, they would see, he thinks, that such men lessen the responsibility and expense resting upon them.

Among other conclusions arrived at were that supporting piers should be constructed where practical of brick, that all roofs should be flat and of fire-resisting material, that floors also should be fire-resisting, and iron girders, columns, and supports should be protected by plaster or tiles, that all staircases should be enclosed by a nine-inch wall at the least, and any openings filled with fire-resisting doors.

FIRE AND POLICE PERSONALS

—Chief J. Thad Mullin was elected Chief of the Fire Department of Birmingham, Ala., by the Board of Aldermen and the Mayor.

—Chief W. R. Joyner, of Atlanta, Ga., fire department, was recently requested by the insurance companies of Columbia, S. C., to inspect the fire department of that city.

—Chief Maddox recommends an increase in salaries for the firemen of Fort Worth, Texas. The officers are to receive an increase of ten dollars and the privates five dollars a month.

—Chief Benoit of the Fire Department of Montreal, Can., desires that the older men in the department be assigned to the outlying districts and that the young men be placed in the central portion of the city.

—Former Chief Charles Charles H. Whitney has been appointed chief of the Nashua, N. H., department to succeed George O. Osborne. Chief Whitney has been a fireman for many years and has filled every position from the bottom of the service up.

—As a result of his trip to the Chief's Convention, Chief Campbell, of Portland, Oregon, recommends that a fire boat, water tower and a full paid force instead of a call force, be secured. Hydrants should be placed in charge of the fire department, according to Chief Campbell.

—Chief Musham of the Chicago, Ill., fire department, advocates the prohibition of the use of gasoline in his city. He says that nothing is feared so much by the firemen as gasoline. One hundred and thirty-six fires last year were due to explosions of gasoline and kerosene.

—The first move to change the department of Norwich, Conn., from a volunteer to a combined permanent and call force, was made by Chief H. L. Stanton, by transforming the Neptune hose station to a modern fire station with a combination chemical and hose wagon and all improvements.

—Rumors have been circulated that Chief Conway of the Jersey City, N. J., fire department is to be retired on a pension and that Fire Commissioner James Hennessey, is to be made Chief. Chief Conway himself was a commissioner and succeeeded Chief Farrier twelve years ago.

—James A. Jackson, Chief of the Police of Centralia, Ill., was recently suspended by Mayor Rohl, on charges of shortage in accounts in connection with the dog fund. Chief Jackson claims that the charges were made by the Mayor because of the evidence given by Chief Jackson and others at the trial of Mayor Rohl for malfeasance in office. The Chief has been eight years at the head of the department, and was twice appointed by Mayor Rohl.

—Andrew J. Kennedy, former Chief of the New Haven, Conn., fire department, and ex-President of the International Association of Fire Engineers, died November 27th of heart trouble. Chief Kennedy was 71 years of age and had been a resident of New Haven since his birth. He entered the fire department in 1846, and with the exception of the time he served in the Civil War, was an active member until 1897, when he retired. He succeeded Chief Hendricks as the head of the department in 1892, and was retired in 1897, on a pension because of injuries received in the service.

—The suburban villages about the city of Scranton, Pa., have been urged by Chief Furber of the Fire Department of that city, to contribute towards the construction of a flat bottom motor car. By means of this car apparatus can be transported quickly to any of the outlying districts and thus these suburban towns will enjoy the use of the fire department of Scranton in case any conflagrations arise. The distance that the apparatus has to go at times, causes a severe strain upon the horses, but by the use of this car the horses and apparatus can be transported quickly and be in excellent condition upon arrival at the fire. Springfield, Mass., has had such a car in use for some years and it has been of the greatest value to the outlying towns.

—Chief J. A. Campbell, of the fire department of Elmira, N. Y., has been suspended on some frivolous charges preferred by a former member of the department. The fire commissioners, strange to say, considered the charges of sufficient weight to suspend the Chief. The general charge was incompetency and misconduct with twenty-five specifications. An illustration of the seriousness of these charges is given by one of the specifications, which stated that the Chief failed to report to the Commissioner when a ladder company responded to a wrong box. Later reports state that Chief Campbell has been retired on a pension at his own request and Captain Charles H. Riggs has succeeded him.

—Chief Charles A. Donovan of the Hoboken, N. J., police department has been retired from service despite his efforts to retain his position. Chief Donovan is the oldest police chief, in point of service, in the United States, and the only reason that is assigned for his retirement is that people want a younger man. Chief Donovan is still strong and hearty and perfectly competent to perform all the duties of his position, but his political enemies desired his removal and this was accomplished during the illness of City Clerk Haggerty, who was unable to prevent the resolution from going through. In his place has been appointed Patrick Hayes, Jr., who at the time of the Chief's retirement was a roundsman. A series of lightning changes raised Hayes from a roundsman to a sergeant, retired his father, Capt. Hayes, on half pay, made Sergeant Hayes a captain and then made him chief, all within a period of seven minutes. The rapid rise of Hayes was calculated to make him dizzy had he not been advised before hand of the proceedings. Ten years ago Chief Donovan's salary was raised from $2,000 to $2,500, but by an illegal act, the resolution was rescinded. The Chief now is determined to fight for the $5,000 back pay to which he claims he is entitled.

WHAT POLICE AND FIREMEN ARE DOING

Motors to Draw Fire Engines—How Smoke Explodes—Strength of London's Police—Greater Protection Necessary for Washington—Volunteer Policemen

Volunteer Policemen

ONE of the peculiarities of the Island of Jersey, England, is that citizens of prominence serve as honorary policemen. In the town of St. Heliers there is a paid force of a dozen men, but in addition to these, a number of gentlemen serve without pay. These men are chosen by popular vote, and as the service is regarded as honorable to the individual and patriotic to the state, considerable spirit is manifested during elections. For a long period there has been no crime on the island of Jersey.

Winnipeg Puts in Its Fire Alarm System

AFTER several years' effort, the city of Winnipeg, Manitoba, has come into control of the fire alarm system, which was previously in the hands of a contractor. Under the supervision of the city electrician, F. A. Cambridge, the wiring of the city and the installation of the plant was done, and the plant was placed in the upper part of the central fire station. The Bell Telephone Company has operated the system for some eighteen years, but for some time the citizens considered that the city itself should have complete control. The system has been greatly improved by the introduction of a greater number of circuits, and whenever it is considered desirable, the manual system of treating alarms will be substituted for the present automatic repeater.

May Abandon Police and Fire Departments

DURING the last month a controversy arose between the Common Council of Canton, O., and the Board of Trade over the financial condition of the city. The board obtained an injunction against the Council restraining it from borrowing money to pay expenses of the government, etc. The Finance Committee of the Council refused to pay any of the salaries of the city employes until the injunction is vacated. At last reports the situation had reached such a point that, unless the firemen and policemen agree to serve without pay until March, these two departments will have to be abandoned. The Board of Trade objects to the borrowing of more money because of the extravagance of the Council and it does not desire that extravagant salaries be foisted on the city under the new code that is soon to go into effect.

Motor to Draw Fire Engine

A MOTOR car for drawing a fire engine or an extension ladder has been recommended to the London County Council by the head of the fire department of that city, Commander Wells. The Council has accepted the suggestion and has drawn up a design of the kind of motor that would be desirable. One offer has been received by the Council from a local company who offered to supply a 10-horse-power engine of the kind required for the sum of $3,000 if an order for six motors were given it. As the Council would not, at first order more than one, the price was fixed at $3,750, with the option of reduction of price to $3,000 if, after tried, the other six were taken. This offer of the company has been accepted on recommendation of the Fire Brigade Committee. This marks a distinct advance on the part of the London Department to do away with horses to draw apparatus.

POLICE PROTECTORS OF DETROIT, MICH., ON INSPECTION

Fire Force at Hamilton

THE fire area of the city of Hamilton, Ontario, consists of 3,990 acres and the population of the city is 53,000. The last report of Chief A. W. Aitchison states that the buildings in the city are not over six stories in height and are of brick or stone in the business sections, while some frame structures make up part of the residence sections. The department responded to 226 alarms, of which 111 were for serious fires. There was a loss of $155,660.77. To fight these fires the Chief has one steamer, two combination chemical

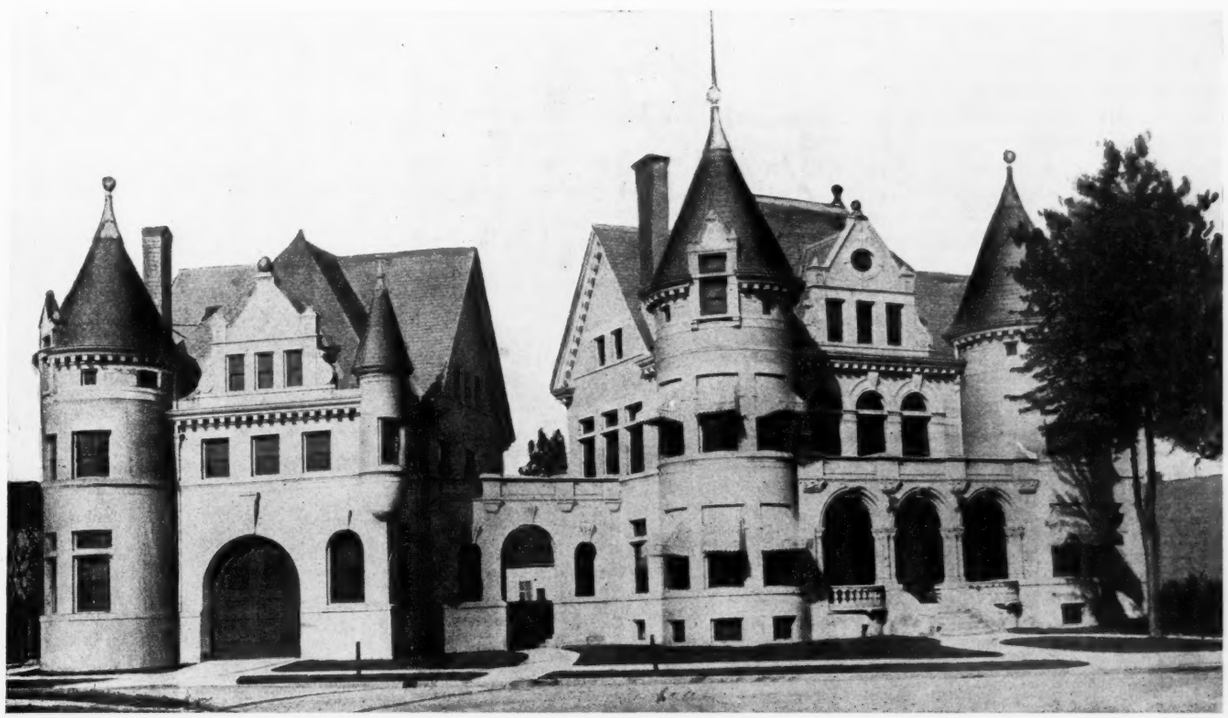
engines and hose wagons, a hook and ladder truck, four hose and a supply wagon. In reserve is held a Hays' aerial truck, one combination chemical engine and hose wagon, a hand fire engine and a seventy-foot extension ladder on wheels. There are 11,000 feet of cotton hose and nineteen horses. There are forty-six fully paid men, and Chief Aitchison serves as superintendent of fire alarm telegraph.

Overhead Wires Hinder Firemen

DURING the last year, as nearly as could be estimated by Chief N. A. Ball, of the Oakland, Cal., fire department, the fire losses amounted to $37,950.48, of which amount $35,620.72 was covered by insurance. There were two hundred and eight alarms during the last year and some five hundred hours were consumed in fighting fires. The cost of maintaining the department, exclusive of the charge for water, was $82,169. The Chief recommends that several new pieces of apparatus be purchased and that all wires attached to the top of buildings be removed, because they greatly interfere with the firemen in the handling of fires. In the business sections of the city, Chief Ball would have all wires placed underground. A further improvement would be the replacing of water mains with larger ones, inasmuch as the pressure at times is not what it ought to be for the successful handling of big fires.

Police Force of London City

THE police of the city of London, England, at present consists of 1,056 officers and men. Among this number there are two superintendents, three chief inspectors, thirty-nine detectives and plain-clothes men, and eight hundred and eight constables, or ordinary policemen. The wages range from $6.75 a week to $1,750 a year. In addition to this pay they also receive 75 cents a month for "boot money," and eight of the sergeants and one hundred and seventy-four constables receive 62 cents and 37 cents each a week for regulating the traffic. One of the most remarkable items of the amount required for the coming year is $7,750 for voluntary contribution to taxes, the corporation of the city being under no legal obligation to pay taxes on police stations. The total amount required to run the department is $814,980. Although the expenses have been increasing gradually during the past seventeen years, the tax rate for the department has been gradually growing smaller. The present incumbent of the office of Receiver, John W. Carylon-Hughes, has held office for seventeen years, and by an Act of Parliament, is a perfectly independent official with complete control over all expenses and receipts.



ONE OF THE NEW POLICE STATIONS IN DETROIT, MICH.

How Smoke Explodes

THE phenomenon of exploding smoke which often puzzles firemen, has been explained by Inspector William McDevett of the Philadelphia Fire Insurance Society. Inspector McDevett explains that in a fire free carbon arises and mixes with hydrogen. In addition to this, methyl, alcohol, creosote, and other gases, are present. These become heated to the point of ignition and explosion is the result. Smoke explodes when heated to about 800°, but is often ignited by sparks from burning material. When thick smoke is ignited it becomes incandescent and rolls through a room with such force as to shake the walls. Formerly firemen would keep the windows and doors closed in an endeavor to have the smoke smother the flames, but they now realize their mistake and endeavor to let out the smoke as soon as possible. One way to prevent explosions of smoke in large stores, is to have an air shaft of considerable size in the centre and this would prevent a lateral spread of the fire.

More Apparatus Needed in Washington

THE losses by fire in the District of Columbia for the past year amounted to $134,504 and was the smallest loss for the last twelve years, being less than half of the year previous. A serious fire occurred last spring, demonstrating the weakness of the department's reserve force, and Chief Dutton asks that an appropriation be made to enable the department to have in reserve a sufficient number of companies to handle any second fire that might occur when the other apparatus are engaged. The Chief asks that the pay for the members of the department be increased because of the fact that they are paid less than the members of any other department, and because only one day in six can be taken off by any man, the rest of the time being spent at headquarters both day and night. Should any member of the company be ill the members of that company are then allowed one day in nine, and if two members of the company become ill no one is allowed a day off until one of the men returns. Every member of the force is compelled to supply himself with two uniforms a year, and the Chief asks that the men should be allowed by the department a summer and winter uniform each year, to pay them for the many uniforms that are ruined in the discharge of their duty.

How to Escape from a Fire

ACCORDING to a press report from St. Louis, Mo., Chief Swingley, of the Fire Department of that city, is reported to have said that in forty-nine out of every fifty cases where persons jump from burning buildings and are killed or injured they would be rescued if they waited until the arrival of the firemen.

"What persons should do if cut off from escape is to shut the door of the room in which they are and make for the nearest window.

"The best way is to crawl. There is always a space next the floor where the air is good. Smoke always rises. I don't care if a building is filled with dense smoke, a window can be reached by crawling and keeping the head close to the floor.

"Persons should get on the outside of the window. The room may be filled with fire, but it will take some time before the fire reaches them. Persons should wait until their clothes catch on fire before jumping. It is almost sure death to jump.

"Burning buildings do not fall immediately. They are generally burning at least half an hour before they begin to fall. Even if the building does begin to fall, the portion where one is may not fall. A person always has a chance by remaining.

"With our pompier system we can scale the highest building if there are windows to which to attach the ladders. One of our missions is to save lives, and when we see persons in danger every effort will be made to save them.

"Of course, when persons are placed in great danger, minutes seem like hours. The engines get to fires in the majority of cases within a few minutes after the alarm has been given.

"Another thing that I am reminded of is the fact of how few persons know the location of the fire-alarm box nearest to their residences, and how to give an alarm. Every one should familiarize himself with the location of the box and how to turn in an alarm."

Test of Fire Engines at Atlantic City

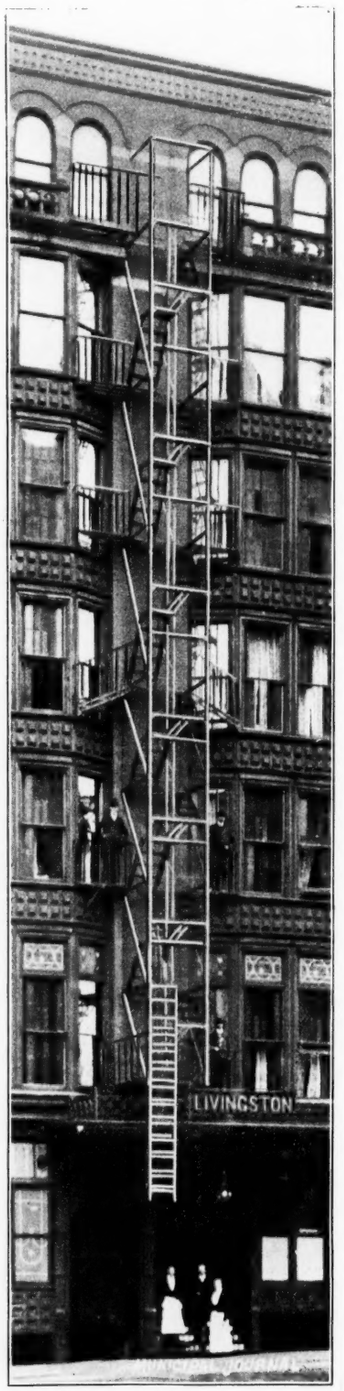
THE competitive test between a first-class steam fire engine made by the American Fire Engine Company of Seneca Falls, N. Y. and W. S. Nott & Co., of Minneapolis, Minn., was conducted by the fire department of Atlantic City, N. J., under the direction of Chief Isaac Wiesenthal. The conditions of the tests were that fires were to be made of shavings, wood and coal only, and that the water must be draughted by the engine and not taken from the hydrants. Nozzles and siamesed joints were exchanged during the test so that no advantage was given either side, and the points counted in favor of the winner were to be rapidity in raising steam and forcing water with at least one gauge of cold water in the boiler, and to throw water the best distance through two lines of hose one hundred feet long each, with one and one-half, one and three-quarters and two inch nozzles.

The American make of engine, known as the Metropolitan, had up 140 pounds of steam before the Nott engine had her machinery started, and water was forced through the hose in six minutes and three-quarters of a second, while it took the Nott engine ten minutes to do the same. Through a one and one-quarter-inch nozzle the Metropolitan engine threw water two hundred and eighty feet, while the Nott engine had a record of only one hundred and seventy feet. With a one and one half-inch nozzle, two lines siamesed, two hundred ninety-three and one-third feet was the record of the American engine and two hundred forty-one and two-thirds that of the Nott. For the one and three-quarter inch nozzle, with two lines siamesed, the Metropolitan averaged two hundred ninety-six and two-third feet; the Nott engine, two hundred feet. With the two-inch nozzle and four lines siamesed, the Metropolitan engine reached a distance of two hundred ninety-five feet and the Nott one hundred and seventy-five feet. During the test the average water pressure of the American engine was one hundred eighty-five and one-half pounds and the Nott eighty-nine and one-half pounds, while the average steam pressure of the former was one hundred twenty-four and five-sixths pounds and of the latter fifty-seven pounds. Out of the total of three hundred points the Metropolitan engine received two hundred and eighty-five. As the Nott engine became disabled after the fourth test, further tests could not be carried out. The City Council voted to purchase the American engine.

A Well Made Fire Escape

THERE are many kinds of fire escapes; but few of them are worthy of a second thought, and some of them are more dangerous than the fire itself. The knotted rope or metal ladder which is to be dropped from a window to the ground, thus affording an opportunity for the occupants of a burning building to escape, is better than nothing, but at the best, is not to be compared with a permanent fire escape such as is used in the city of Rochester, and shown by the accompanying illustration.

This escape was invented and patented by Assistant Fire Marshall James M. Brazill, and it has received the official approval of Commissioner of Public Safety George A. Gilman, Fire Marshal J. A. P. Walter, Chief Engineer James Malcolm, of Rochester, where the escape has been in use for several years. "This contrivance," said Mr. Brazill, "affords rapid and safe exit from buildings in time of panic. No part of it is in front of windows of the building to which it is attached and therefore escape cannot be cut off by flames or red hot iron. It is simple in construction, practicable, safe and sure in operation. It affords complete protection to not only the young and vigorous, but what is much more to the purpose, to the old, the crippled and the infirm. It is properly adapted to the practice of fire drills and is therefore peculiarly suitable for institutions, educational buildings and asylums.



THE ROCHESTER FIRE ESCAPE

"The standard size of the Rochester Fire Escape is four feet six inches in front by five feet four inches side measurement. It is entirely enclosed by heavy wire mesh, thus preventing falls. The outside framework is of angle irons, horizontal and perpendicular, tied in with rods, causing a 'pull down' instead of a leverage on the walls. The weight is distributed equally at all points and at no point is the stairway supported on dangerous brackets. In the center of the stairway is an opening or well, six inches wide, protected by an iron hand rail and balusters extending from top to bottom, and it is entirely practicable and in many cases desirable that a stand pipe be put up through this well with openings for hose couplings on the level of each floor making connections for the supply of water possible at each floor.

"The capacity of this escape is easily equal to that of four ordinary fire escapes. Overloading is practically impossible as a continuous procession can move downward without interruption or accident."

LITERATURE ON MUNICIPAL TOPICS

Reviews of Some Important Books—What the Magazines and Reviews Have to Say About Civic Affairs—Municipal Reports Received

Books

THE third volume of *The History of Enfield, Conn.*, by Francis Olcott Allen, continues the history of that town as told in the preceding volumes. This volume deals with the early deeds of the town, the church and town records, probate's records, graveyard inscriptions, etc. The index, which covers all three, is appended to this volume.

♣

THE object of publishing the *Design of Simple Roof-Trusses in Wood and Steel* is that the student who desires to master the elements of structure will not have to seek out his information from many expensive books, but will have all the necessary information compacted in these 124 pages. The author, Mr. Malverd A. Howe, collected the data in these pages for a course of lectures on roof-truss design for the Rose Polytechnic Institute, Terre Haute. There are six chapters devoted to the general principles and methods, beams and trusses, strength of materials, roof-trusses and other design, design of a wooden roof-truss, and the design of a steel roof-truss. Twenty pages are devoted to a number of valuable tables showing the standard sizes, weights, etc., of rivets, beams, bolts, etc., etc. John Wiley & Son, New York, price $2.00 in cloth.

♣

IN order to warn investors from putting their money into electrical corporations that promise all sorts of luring results for nothing, Mr. William D. Marks, C.E., has written a small pamphlet entitled, *Finances of Gas and Electricity Manufacturing Enterprises.* This pamphlet is divided into five chapters, in which the first is devoted to the story of a typical electrical company, against which the book is a warning; the second is a letter to a city council concerning the cost of production of incandescent electric light, in which is given the actual cost of producing incandescent light, and tables showing the price of running a 16-candle power lamp for from one to twelve hours. Chapter III is devoted to the commercial analysis of small and unprofitable electric lighting and power enterprises. Chapter IV is devoted to commercial electrical measures and prices, and the author gives practical figures for the guidance of those who would venture into this business. In Chapter V appears the methods of establishing prices for gas and electricity, showing the formulæ to be used in determining these figures. A number of valuable tables are also given and appended to it is a list of the electric light companies of Massachusetts, with data about their expenses, out-put, etc. This little book is invaluable to any one, be it private company or city, that would venture into the business of supplying electricity for municipal or private consumption. Price $1.00.

♣

A COPY of the proceedings of the Boston Conference for Good Government, held under the auspices of the National Municipal League, was sent us by the editor, Mr. Clinton Rogers Woodruff. This report contains, besides the general proceedings of the conference, all the pages delivered by the various speakers. These include "A Year's Municipal Progress, by Clinton Rogers Woodruff; "Harrisburg's Advance: A Lesson to Smaller Municipalities," by J. Horace MacFarland; "The New York Situation," by Dr. Albert Shaw; "Pittsburg's Victory," by George W. Guthrie; "The Philadelphia Situation," by Charles Richardson; "The Boston Situation," by E. H. Clement; "The Street Railway Situation in Chicago," by George C. Sikes; "The Franchise Situation and the Referendum in Cleveland," by Dr. Edward W. Bemis; "A Non-Partisan Administration," by Eugene A. Philbin; "Massachusetts Charter Legislation," by Prof. J. H. Beale; "A Movement for Honest Government," by Charles J. Bonaparte; "American League for Civic Improvement," by Prof. Charles Zeublin; "American Park and Outdoor Art Association," by E. G. Parker; "Instruction in Municipal Government in American Educational Institutions," by President Thomas M. Drown; "Syllabus on Municipal Government," by Dr. Samuel E. Sparling; "American Municipal Progress," by Prof. Charles Zeublin; "Municipal Art as a Subject of Study in School and College," by John Quincy Adams; "Uniform Municipal Accounting in Boston, Baltimore, and Other Municipalities," by Harvey S. Chase; "The City as a Business Corporation," by Laurence Minot.

Copies of this report may be obtained, by addressing the editor, Mr. Clinton Rogers Woodruff, North American Building, Philadelphia, Pa., for the sum of $1.00.

♣

Sanitary Engineering: A Practical Manual on Town Drainage and Sewage and Refuse Disposal, is a book of 300 pages, by Francis Wood, Borough Surveyor of Fulham. This book deals with the science of sanitary engineering in a concise and intelligent manner, and contains information and data that is invaluable to students who would take up the subject. Especially for municipal engineers and health officers is it useful, or it can be read with profit by any other city official. The question of the disposal of a city's sewage and refuse is one about which much must yet be learned, and in this book the question of refuse destruction and destructors has been carefully treated and the different systems considered from an unbiased standpoint. Each chapter is practically complete in itself, and on any point that is disputed, the author has been careful to give his reasons fully. The illustrations, while profuse, have still been chosen with the object of showing only the detail necessary to explain the text and this adds special value to the work. There are nineteen chapters as follows: I, Introduction; II, Hydraulics, etc.; III, Formulæ for Velocity of Water in Pipes, etc.; IV, Earth Pressure and Retaining Walls; V. Power; VI, House Drainage; VII, Land Drainage; VIII, Sewers; IX, Separate System; X, Sewage Pumping; XI, Sewer Ventilation; XII Drainage Areas; XIII, Sewers, Manholes, Lampholes, etc.; XIV, Trade Refuse and River Pollution; XV, Sewage Disposal; XVI, Bacteriolysis; XVII, Sludge Disposal; XVIII, Construction, Materials, and Cleaning of Sewers; XIX, Refuse Disposal; XX, Chimneys and Foundations.

Numerous formulae are given and many of the sanitary problems are worked out in full from an engineer's standpoint. Copies of this book in cloth can be obtained through the MUNICIPAL JOURNAL AND ENGINEER at the price of eight shillings and six pence.

♣

THE question of a pure water supply is a vital one and every city in the world must sooner or later have the question forced upon it for decision. Almost the first thing, however, to determine, is what is a pure water supply. The contracts which are often made with a water supply company specify that the water supplied to the citizen must be "good, pure and wholesome," but if at any time any epidemic of disease occurs such that the water supply could be held responsible, this clause in the contract relative to a "good, pure and wholesome" supply at once becomes an object of dispute. If the city officials in whose hands is placed the making of these contracts, have in their possession a copy of *Water Supply*, by William P. Mason, Professor of Chemistry in the Rensselaer Polytechnic Institute, there should be no necessity for any such mistake being made in a contract. This book has passed through two editions and has been, in a great part, rewritten for the third. The question of a water supply is considered principally from a sanitary standpoint, and as such, is of special value to city officials. While all such are not engineers and have to do with the strictly engineering construction of the water works any and all of them should be versed in the sanitary aspects of the question.

The book is divided into eleven chapters, the first of which is an introduction and outlines the old water supplies of Rome and other ancient cities. Chapter two takes up the question of drinking water in its relation to diseases and considers the question of cholera and typhoid epidemics. In Chapter III the artificial purification of water is discussed. This includes the question of water filters of all kinds and for all purposes. The natural purification of water is the subject of Chapter IV. This includes nitrification, direct oxidation, sedi-

mentation, laws relative to the pollution of streams, etc. Chapter V discusses rain, ice and snow as they affect the purity of any water. River and stream water is the subject of Chapter VI. This chapter is especially valuable because sooner or later most cities will be compelled to draw their supply from rivers and the rapid disappearance of the forests of the country will have a great influence on the water supply. Stored water is the subject of Chapter VII. In this is included lake water, sedimentation in reservoirs, the effect of street-main upon bacteria in water, growth in algae in the stored water, etc. The movement of water through the soils and property of soils, driven wells, pollution of ground water, etc., is taken up in Chapter VIII. Conditions governing the storing of deep seated waters, such as artesian wells, sea springs, bacteria in deep seated water, etc., is discussed in Chapter IX. In Chapter X, under the "Quantity of Per Capita Daily Supply," is given statistics of the per capita supply in the various cities of the world, statictics showing the waste of water and the influence of meters in preventing this waste, as well as their influence upon the public health. Chapter XI is devoted to the action of water upon metals. This is an important subject for consideration because the character of the water often determines the kind of pipe that must be used in laying out a city water supply. An appendix has been included in this work and in this will be found analyses of city water supplies, death rate and statistics of typhoid fever in cities using sea water for street washing, sewer flushing, etc., and liquids deemed polluting by the English Rivers Pollution Commission. There are 448 pages in the book and a number of fine half tones and cuts. John Wiley & Sons, N. Y., are the publishers, and the price in cloth is $4.00.

Periodicals

The National Magazine for November continues the department on *Progressive American Cities* and in this number stories about Salem, Mass., Ashland, Wis., Washburn, Wis., Bayfield, Wis., Leominster, Fitchburg, and Lawrence, Mass., Fort Wayne, Ind., and Kalamazoo, Mich., appeared under various authorships, illustrated with interesting views. Boston, Mass. Price per year $1.00; per copy, 10 cents.

THE December issue of *"The Arena"* contains an article called *The Garden City Movement,* by Annie L. Diggs, London, England. The author claims for this movement that it is the most comprehensive effort thus far attempted for the advancement of social and industrial reform." She expresses the hope that the United States will not lag far behind England in an organized movement of this character. New York, N. Y. Price, $2.50 per year; 25 cents per copy.

Gunton's Magazine for November has an article by Mr. Clinton Rogers Woodruff, Secretary of the National Municipal League, on *The Municipal Situation in New York.* Mr. Woodruff reviews the last mayoralty election, partially defends the Low administration against its too harsh critics and says "We must not expect too much too soon from the Low administration, for it is working for reforms which have to do with men's opinions and sentiments, and these are changed but slowly. * * * The Low campaign was waged upon a positive platform and bids fair to succeed because of its fulfillment of its positive promises." New York, N. Y. Price, $1.00 per year; 10 cents per copy.

What Public Libraries Are Doing for Children appeared in the September issue of *The Atlantic Monthly* over the name of Hiller C. Wellman. Mr. Wellman, among other places, describes the children's room of the library at Boston, showing how attractive it has been made by photographs, flowers, etc., and says, "The far reaching influence of books upon child nature is hardly realized, in spite of all that has been written upon the subject," and he quotes an instance of a boy who, until he found the kind of stories that interested him, was considered stupid, but once this line of reading was started, a marked change took place in him as regards his studies. In the article on *The Kansas of To-day,* by Charles Moreau Harger, the town life in that State is described. Boston, Mass. Price, $4 per year; 35 cents a copy.

IN the December-March issue of *The International Quarterly* appears an article by Ellis P. Oberholtzer on *Home Rule for American Cities.* He calls attention to the important movement of the simplification of city government, which has reached a considerable momentum in the United States. This is the gradual strengthening of the mayor's hands until he is, in many instances, almost a dictator. This tendency has been promoted by the most competent students of municipal government. He says that state legislatures are in a most serious decline, having lost much of their former title to public respect, their powers having been curtailed by the constitution. More and more have the state legislatures meddled in municipal affairs and "to settle some grudge and to 'strike' vested wealth for large sums by means of blackmail, * * * pass bills changing the legal system of a city." While the city cannot be really free of the legislature's control, a greater degree of home rule should be accorded municipalities than they enjoy at the present time. $4.00 per year; single copies, $1.25. Burlington, Vt.

THE current number of *Municipal Affairs* is devoted mainly to "Housing Problems in Cities." This heading is again divided into two parts, "Housing Conditions," and "The Remedies." Under the former sub-division Robert Hunter describes the *Conditions in the United States.* Mr. Hunter states that the betterment of housing conditions must depend first upon legal enactment, for the selfish interests of the landlords induce them to oppose all rational schemes for the improvement of the dwellings of the poorer class. *Conditions in England* are treated by Percy Ashley, who takes a hopeful view of the situation there and points out the great advancement that has been made since attention was given to the question of social betterment. Improvements in transit has lessened the congestion in the population centres. *Municipal Tenements in British Cities* is contributed by Mrs. Lettice Fisher, who describes the betterment schemes instituted by the more important cities of Great Britain. *The Housing Conditions in Germany* are described by W. B. Guthrie. Mr. Guthrie's residence and study in Germany has prepared him to speak upon the subject. The tables he gives are especially instructive and he adds a history of the various schemes and legislation for improving the houses of the laboring classes. *The Housing of the Poor and Middle Classes in France,* is taken up by Willard E. Hotchkiss, who shows the evil effect of vicious legislation upon housing conditions and quotes the example of the door and window tax, which has led to the construction of tenements and lodging houses without a single window. Dr. Adna F. Weber contributed an article on *Rapid Transit and the Housing Problem,* which is placed under the sub-head of remedies. Dr. Weber demonstrates that the only permanent relief for congested conditions is by a great improvement in transit. *The Taxing Power and the Housing Problem* is treated by Lewis L. Post, who suggests that the support of cities comes mostly from indirect taxes which are shifted to the consumer. This tends to raise rents and thus force down the standard of housing accommodations. He suggests that if taxes were levied upon site values instead of upon building materials, rents would fall and more roomy apartments could be had by the laboring class at less cost. *Housing of the Very Poor* is an article by John Mann, Jr., and one on *Socialism* is contributed by John Edwards. Robert W. DeForest in his article on *Municipal Regulation Not Ownership,* decries the evil of municipal ownership as militating against the self-respecting and independent spirit of American Workmen, and he maintains that the government should only interfere to encourage and protect individual effort and not to teach the people to lean upon it as they do in foreign countries. Two other articles under this sub-heading are *Enlightened Management* by Ellen Collins, and *Co-operative Housing,* by Henry W. Wolff. Louis Windmüller has contributed *Disposal of the Dead in Cities,* in which he discusses the overcrowding of the cemeteries in all cities, and shows how the growth of many villages, especially those about New York, are hindered by the proximity of large burying grounds. *A Civic Centre for New York,* is contributed under the auspices of the Municipal Art Society. New York, N. Y. Price $2 per year.

REVIEW OF MUNICIPAL REPORTS

Success of Municipal Electric Plant—Covington Adopts Universal Water Meter System—Will Place All Wires Underground

Fair Rates Yield Good Income

THE last report of the Water Commissioners states that the receipts were $34,792.45, the general expenses $19,809.25 and the total disbursements $29,050.17, leaving a balance in the treasury of $5,742.8. The flat rate is $4.00 for each private family and the rate by meter 20 cents per 1,000 gallons, when only that amount is consumed per day, with a sliding rate up to 6 cents for 10,000 or more gallons per day and a minimum rate of $6. The supply is from springs and runs by gravity a distance of three to six miles. The reservoirs have a capacity of 13,000,000 gallons and give a pressure of from eighty to 120 pounds. About forty-five of the sixty-eight pages of the report are devoted to a list of all the persons that used water during the year with the amounts paid.

Whole City on Meter Basis

ACCORDING to the last report of the Water Works Commissioners of the city of Covington, Ky., all free water has been metered and thus the whole system has been placed on a meter basis. The commissioners state that "meters do not restrict a legitimate and bountiful supply of water for necessary purposes, but give plenty of it from a sanitary point. * * * Paying for water by meter is the only fair way. The only restrictions are careless waste and leaks." The minimum allowance for the month was 2,680 gallons; for which the low price of fifty cents was charged. This statement is in line with many others that appear in reports of water departments, for the enormous consumption per capita in American cities is forcing upon officials the necessity of curtailing the large amount of waste that a "flat rate" system permits. According to a statement by Mayor W. A. Johnson, a lower water rate and an exclusive meter service materially increases the revenue by increasing the number of water takers, which results in permitting the people to get plenty of pure and good water at a small cost. In Covington the minimum water rate has been decreased from $11 in 1900 to $6.00 at the present time.

Desires Control of Electric Wiring

DURING the last year "the greatest improvement in public lighting was the substitution of arc lamps of the enclosed type for the old style open lamps." The report of Electrical Engineer Walter C. Allen of the Electrical Department of the District of Columbia, starts off with this statement. While the entire number of lamps in the city has not been changed to the new type, the work is being carried on, and it is hoped that in a few months will have been completed. The number of arc lamps of the enclosed type, connected in series, is two hundred and fifty-seven, and of the open type, connected in series, two hundred and eighty-two. There were three hundred and twenty-two lamps of the low tension direct current enclosed type. These changes resulted in a considerable reduction in the number of outages, and also enabled the company to furnish a steadier and more uniform light. The contract for naphtha lighting was awarded the American Developing Company at the rate of $18 per lamp per year. There are six kinds of lamps in use in the city of Washington, and these are gas, Collis, Welsbach, naphtha, incandescent, and arc. By far the greatest number of lamps are of the gas type and these are followed by naphtha and arc lamps.

The department has control of all the wires in the city, including telegraph and telephone. A law passed by Congress last June authorized the Commissioners of the District to compel the telephone companies to place their wires underground as speedily as possible. Only such poles as are necessary to make house connections will be allowed to remain standing. The inspection of wiring electrical apparatus was carried on by two inspectors during the last year, but the work is so extensive that the engineer asks that additional men be appointed to assist. All public and semi-public buildings are inspected by the Department to see that the proper precautions are taken in wiring them for electricity and to make sure that all recommendations of the Department are carried out. Inspection has shown that in many places the wiring is worn and unsafe, and much of the work was done in an unskilled manner. The Department desires to have authority from Congress to inspect private premises as well as public, but has not been successful in securing this permission. The result of all inspection, according to the engineer, emphasizes the need of municipal supervision and control of all electric wiring in the District.

Municipal Lighting in Detroit

EVER since the introduction of the municipal lighting plant at Detroit, Mich., the cost of arc lights to the city has been growing less. The report of the Commissioners for 1901-2, shows that the cash cost per arc light for the year ending June 30, 1902, was $39.45; for the previous year it was $42.59. The cost of operating each arc light (cost of operation divided by average number of lights) equals $63.82. As the report states, the gross cost of operation does not measure the cost of public lighting to the citizens, because certain incomes reduce the actual cash cost of operation. The report, after speaking of the wide spread growth of municipal ownership in England, states that "Sooner or later every city must be conducted on business principles, and all the municipal enterprises in England show a profit and diminished taxes." It is time for the American cities to catch up with the English in point of progress.

The Commissioners state that if they were authorized to do commercial lighting as well as public, that they could install eight-candle power lights in any home at a cost of about one-quarter of one cent per hour. Were they allowed to do this work and charge the usual price per k. w. they could light the city for nothing and have a balance in the treasury. The usual objection to municipal lighting is the fact that the cost is greatly increased because eight-hour work days are in vogue, while private plants work their men about ten hours, but at Detroit the workmen only serve eight hours a day and yet the plant is in a prosperous condition. Incandescent lighting includes all public buildings and the police and fire departments, as well as many of the schools and fire house; eventually all will be lighted. The Commissioners request that a warehouse be constructed for their use so that the stock of necessary material may be kept on hand. The need of increased space for the storage of coal is most urgent, for, according to the Commissioners, if the railroads could not deliver coal steadily, they could not keep the plant running, as there is storage for a few days only. To remedy this, the Commissioners recommend that a warehouse be built at a cost of about $15,000, in which can be kept everything needed, and on a portion of the property to be purchased for this house, can be built a public bath house, of which the city is in need. The Commissioners also ask that a separate telephone system be installed in connection with the police and fire departments systems, at a cost of about $2,500. On account of interruptions and inability to secure prompt connections by outside telephones, much improvement in the operation and maintenance of the lighting service was prevented, because repairs could not be instituted promptly. The Commissioners ask that some steps be taken to have the city control the stringing of wires in the streets. Many unclaimed wires are still on poles and these wires are dangerous to life and property. The greater part of the report is taken up with statistics showing, in different ways, the cost of lighting, both by month and by year.

The Horsfall Destructor

THERE are several types of garbage incinerators in use in English cities, but none is more effective and economical in its work than that known as the "Horsfall" destructor. This well-known company has machines in operation in England, Scotland, Wales, Ireland, and several countries on the Continent. The largest destructor in the world is at Hamburg, thirty-six cells, and is of the Horsfall type. This destructor has been in use for more than five years. It destroys the waste of the city, consisting of domestic, town, dock, and street refuse.

The destructor works consist of two separate and symmetrically arranged parts, each of which can be operated alone. The flues and boilers are also separate. A transverse flue can carry the gases from one section to the boilers of the other. There is only one chimney.

It requires only one stoker to three cells to keep the plant going, but three shifts of men, of eight hours each, are employed. The quantity burned per cell in twenty-four hours, was about 8,800 pounds at first, but it now averages about 17,000 pounds. During the winter it is less.

The smoke and fumes escape through a number of holes into a secondary chamber, the walls of which are kept at a red heat by the combustion. While passing over this chamber the combustible gases are destroyed. The gases then pass through another chamber with a much larger cross section, where the dust is deposited and removed every three months. The forced draft is produced by two centrifugal blowers, connected with an electric motor of about 16 H. P. There is one to eighteen cells. These blowers have been in uninterrupted use since the plant was constructed and have given perfect satisfaction. The draft of the chimney produces a vacuum in the cells of about one-half inch of water column; in the ash pit a pressure is caused by the blowers of one and one-quarter inch water column. The main flues extend to the boiler house, where the hot gases are utilized. There are two boilers in use.

The steam power developed is not only sufficient to run the small electric plant which is used to light the works, but there are more than one hundred horse power now going to waste. Any further information concerning the work of tis destructor can be secured by addressing the Horsfall Destructor Co., Ltd., 36 Great George street, London, S. W., England.

Vitrified Clay Water Pipe

FOR a long time engineers have been using vitrified clay pipe instead of brick for the construction of sewers and great satisfaction has been given by the pipe on account of its cleanliness, strength and durability. The use of the clay pipe for sewers needs no recommendation, but its substitution for iron pipe for water mains is an innovation. There is no reason why the vitrified clay pipe should not give as good service in the one case as in the other.

The city of Hartford, Conn., has set an example to other cities in this line by laying a twenty-four inch water main of double strength vitrified clay pipe which carries water between the Hartford and West Hartford reservoirs. Before the introduction of this conduit line, the water flowed along a canal by the side of a road. This method of transporting the water was open to serious objections on account of the danger of pollution, but the length and size of the pipe line necessary to take the place of the canal, placed the laying of an iron or steel conduit out of the question. The problem was solved, however, in a most satisfactory way by the American Sewer Pipe Company of Pittsburg, Pa., which put in the twenty-four inch main referred to above and shown in the illustration. The line is 16,000 feet in length and is capable of carrying more water than was calculated for by the engineer. The crushing power which the pipe can withstand may be judged from a test of a thirty-inch pipe which withstood a lateral pressure of 27,875 pounds.

The joints were made with oakum, dipped in asphaltic cement and covered with neat Portland cement. The sockets are made four inches in length and are corrugated so as to make a better joint. When carefully made these joints are as strong as the pipe itself, in a test of one of them sustaining a pressure of 270 pounds per square inch before the gasket blew out. The pipe itself will last forever. No acids will affect it and the stray electric currents that are rapidly destroying the iron water service mains can work no damage to this pipe.

The loss of velocity from friction is very much less than is the case with iron pipe because of the smoothness of the surface of the

TWENTY-FOUR INCH VITRIFIED CLAY WATER CONDUIT LAID FOR HARTFORD, CONN., WATER WORKS

vitrified clay and for the same reason the pipe line is sure to be much cleaner because no sediment can find lodgment on the sides or bottom in such a way that the velocity of the water will not dislodge it. The small cost of the vitrified clay pipe as compared with iron is also an important factor in its favor when any amount is to be laid.

Lake Forest Sewage Disposal Plant

IN order to select the best system of sewage disposal for Highland Park, Ill., a committee was appointed by the Council to visit neighboring towns where such plants were in operation and inspect them. The report of the chairman of the committee, Mr. James H. Schulus, on the sewage disposal plant at Lake Forest we have condensed in the following paragraphs. Mr. John W. Alvord of Chicago was the designer of the Lake Forest sewage plant and accompanied the committee in its inspection:

The plant is located on the lake shore in an enclosure of about three-quarters of an acre, surrounded by a high board fence. It consists of a septic tank and ten sand filter beds and is designed to

take care of 250,000 gallons of sewage per day. The entire sewage of Lake Forest is conducted to this one point and delivered to the septic tank, the flow line of which is about three feet higher than the sand filter beds. This septic tank is readily inspected, being housed inside a brick building.

The tank itself is divided into five compartments for the proper regulation and adjustment of the fermentation period. An automatic distribution chamber is contained in one end of the tank building. The liquid capacity of the combined compartments of the tank is about 60,000 gallons. The top of the tank becomes covered to a depth of four inches or more with a dark brown, fibrous and somewhat musty smelling coating, but has not the stench that one will get from an open drain in which sewage empties.

The septic tank is classed as the first stage of filtration, and is designed for the elimination of the greater portion of the floating particles of organic matter contained in the sewage; these particles being given a period of rest, are subject to the action of bacteria which cause fermentation within the tank for a regulated time until the particles are wholly or partially dissolved, then the liquid still containing impurities in solution is drawn off into a smaller tank known as the "dosing chamber," which contains about 8,000 gallons of liquid. When this chamber is filled, it is discharged by means of siphons, and the contents pass in rotation to one or another of the ten sand filter beds; the filling and emptying and successive rotation being accomplished by means of an ingenious device operated by the falling sewage automatically governing the delivery to the filters.

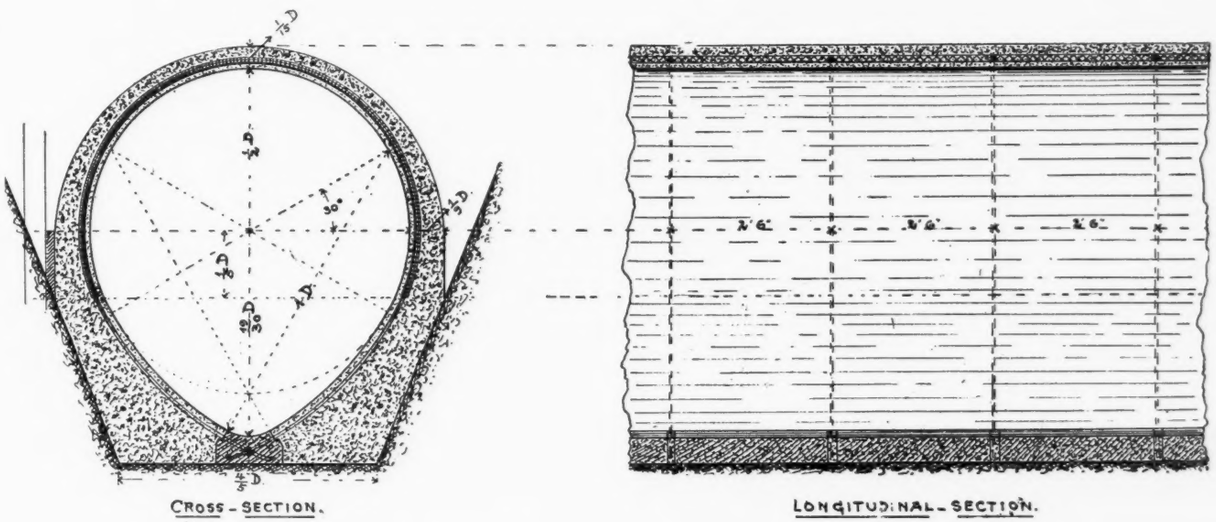
The ten filter beds are formed entirely of four feet of the native sand of the beach of Lake Michigan, leveled off and well underdrained. The beds are rectangular in shape, surrounded with simple plank curb eight inches high and contain each 3,200 square feet, or a total area of three-quarters of an acre. The sand requires to be surface harrowed or raked at intervals, but so far as present experience has gone, it has never been found necessary to replace the sand in the beds. The sand becomes discolored to a depth of only about one-half inch, showing that the work of purification must be nearly all done close to the surface. The effluent from these beds flows directly into the lake, and where taken from the filters before having become mixed with by-pass water is odorless and clear as crystal; and it is stated that repeated tests have shown that 99½ per cent. of the original impurities in the sewage are removed and the effluent is in fact purer and clearer than the lake water itself. The attendance of one man for half a day three times a week is sufficient to keep the plant in running order and the officials of Lake Forest are pleased with its efficiency.

Metal Lath for Sewer Construction

Some fundamental principles of sanitation are found in the Scriptures where an account of the exodus under the leadership of Moses from Egypt is given. Moses was one of the best sanitarians the world has ever known, far in advance of any one of his period, but with all his common sense and knowledge of sanitary laws, he would be unable to cope with the modern conditions as they are found in the average American city. Art and science are both employed in the construction and maintenance of the sewer system of to-day. The engineers of some municipalities have comparatively easy tasks, but when they are confronted with problems such as are found in Chicago, New Orleans, and some other cities, large and small, the cumulative knowledge of centuries is required to achieve the desired end.

Too often the credit is given entirely to the engineer in charge and very little mention is made of any particular material employed. The manufacturer of various materials which are used in the construction and maintenance of a city deserves more credit than he gets. His part is by no means insignificant, and without his assistance many of the great results already secured would have been impossible. For instance, the problems in many localities will be simple of solution by the use of Truss-Metal Lath and concrete filling, without wooden centering. The accompanying illustration shows the cross and longitudinal sectional views. The manufacturer describes it as follows: "The keelstone is made on the premises of artificial stone (concrete) set according to the grade, and with open joints to receive the hoops of round iron, which are temporarily fastened to side planks. The Lath is fastened over the hoops simply by cutting one row of loops on one side, bending the same open. After the lath is pressed over the hoops the loops are bent back and so closed. The lath which acts as a centering for the concrete, needs only to reach the bottom line of the side plank (1/5 D) below the centre point. The hoops act as a guide for filling in the concrete at the lower part of the structure. After the concrete filling is done, a coat of Portland cement mortar, one to three, on the inside, flush with the finished line of keelstone, completes the sewer."

Further particulars about this metal lath may be secured by addressing the Truss Metal Lath Company, 40-42 Gold street, New York.



CROSS AND LONGITUDINAL SECTIONS OF SANITARY SEWER CONSTRUCTED WITH METAL LATH

Acetylene Gas for Street Lighting

Acetylene gas is widely used for street lighting in France, Germany and England. This industry has grown with greater rapidity

on the other side of the Atlantic than on this, and yet the progress in acetylene lighting during the past year has been substantial and gratifying.

The injury to the good reputation of acetylene by defective apparatus is still the greatest obstacle to its rapid introduction, but the satisfactory performance of well constructed machines operating on correct principles, is gradually restoring confidence in this superior illuminant.

The water feed machine which is entirely unsatisfactory except under very small requirements and which has been unsparingly condemned by acetylene chemists from the beginning, is being rapidly superseded by the carbide feed machines which are correct in principle and have much greater capacity than the water feed machines.

The efforts of progressive inventors at present, is entirely directed to the product of carbide feed apparatus, and the especial desire is to produce a generator which will feed lump carbide, as this grade of carbide gives a larger and a better gas yield than can be obtained from the one-quarter-inch carbide, which is commonly fed by carbide feed machines.

In one instance, at least, this object has been most successfully accomplished. The Davis Carbide Feed generator, manufactured by the Davis Acetylene Company of Elkhart, Ind., has power entirely independent of the gas holder bell for operating its feeding mechanism and because of this feature, is enabled to feed lump carbide infallibly.

Acetylene burners have greatly increased in number and been much improved by quality and decreased in price during the past year, so that now there is little, if any trouble with burners where the gas is properly generated, and they have ceased to be of importance as an item of cost in installing and maintaining acetylene lighting systems.

As a medium for town lighting, acetylene is proving its worth, and during the past year a number of plants have been installed, and in many instances are given warm commendation by consumers of the gas generated by such plants.

NOTES OF INTEREST TO THE TRADE

—The Studebaker family recently presented to the Epworth Hospital of South Bend, Ind., over $50,000, in addition to other contributions, to pay in full for a $75,000 hospital building.

—George W. Scott, Consulting Engineer, 758 "The Rookery," Chicago, Ill., desires descriptive catalogues for filing, reference, and specification purposes. Manufacturers will please take notice.

—The Atlas Car & Manufacturing Company, Cleveland, O., has recently issued two handsome illustrated catalogues, giving full description of its specially designed cars for use in and around brick yards and cement plants.

—Messrs. Dodge & Hay, modernizing engineers, have been commissioned by their clients, The Heating, Ventilating & Foundry Company, of Pittsburg, to fully equip the new plant which is being erected for that company at Wheeling, W. Va.

—A recent special cable dispatch to *The Sun*, announces that, after a competition with British and German firms, the Westinghouse Company secured the contract for the equipment of the electric substations of the District Railway in London. The contract price has not been announced, but it is understood to be $1,500,000.

—City engineers, city clerks, city treasurers, auditors, comptrollers, and in fact, nearly all the departments of city government, will be deeply interested in the recent catalogues issued by the Art Metal Construction Company of Jamestown, N. Y. Its New York office is located in the New York Life Building, Broadway. The office furnishings made by this company will not burn. Particulars can be had upon request.

—The Pittsburg Meter Company, of East Pittsburg, Pa., announces in a unique circular, that the entire water supply for the Frick Building, which is the largest in the city, is measured by two 6-inch Keystone Pittsburg water meters. This is a pretty good demonstration of the ability of the Keystone water meter, of this particular type of "disc" meter, to accurately measure large volumes of water under the most severe conditions.

—The Western Electric Company reports very gratifying results from its Constant Potential Alternating Arc Lamp. This lamp operates on the repulsion principle and the favor with which Central Station managers have received this lamp, as well as the fact that a competing manufacturer has recently copied the details of its mechanism, are tributes to its intrinsic worth. The company will be pleased to quote attractive prices to prospective buyers.

—"It's an Ill Wind that Blows Nobody Good" thinks the Standard Water Meter Company, of 245 Robinson Street, Brooklyn, as it is now having a large call for hot water meters, the increase in the demand being attributed to the excessive price of coal. This speaks well also for the prudent engineer who is watching his boiler. These meters are made in all sizes, from three-quarters of an inch to six inches, and are simple, compact and readily attached to any feed pipe.

—The Engineering Company of America, 74 Broadway, N. Y., is prepared to undertake all kinds of engineering work, and has a staff, the personnel of which is unexcelled. The particular branches of engineering which would interest the readers of the MUNICIPAL JOURNAL AND ENGINEER, are hydraulics, civil and electrical engineering and structural work. The officers are: Frank Clemes Smith, E. M., President; Joseph Hyde Pratt, Ph. D., Secretary, and August Roesler, Treasurer.

—Superintendents of electric light plants, municipal and private, will be interested in the recent announcements of the Western Electric Company, of 259 South Clinton street, Chicago, Ill. The company is handling the "New Type Sunbeam," which is of high quality, economical and satisfactory in its service. Then there is the line of burglar alarm springs, door openers, bells and watchman's clocks, and other specialties, all of which have been thoroughly tested and proven satisfactory. Special catalogues in any of these lines may be secured upon request.

—These are the days when the municipal power plants used for electric power and light, gas or water works, not to mention the enormous power plants of the street railway companies, are more keenly interested in devices calculated to economize the use of coal. For this reason catalogue "C," which is fully protected by copyright, issued by the Green Engineering Company, 400 Western Union Building. Chicago, Ill., manufacturers of the Green Traveling Link Grates, will make the more interesting reading. It tells all about the value of this grate and what is to be gained by its use, and besides, gives valuable coal data for the bituminous field of the Middle States.

—American products take the lead the world over. The New York Continental Jewell Filtration Company reports that it has closed a contract with the Maharaja of Mysore, India, through Captain A. J. de Lotbiniere, Royal Engineers, English Army, who was sent from India to New York by this Government for that purpose. The filter plant is to consist of four Jewell Gravity Filters, each twenty feet in diameter, constructed of granite laid in Portland cement. There will be a masonry subsidence basin holding 400,000 Imperial Gallons. The capacity of the filter plant is to be 2,600,000 U. S. gallons. It will be erected early in the spring by one of the Filter Company's engineers. It is to be located at Bowringpet in the Kolar Gold Fields, near Bangalore, Mysore. Mr. E. B. Weston, A. S. C. E., Consulting Engineer.

—The W. N. Wight-Easton Company, 160 Fifth avenue, New York, who are general contractors for the Wight Lock Woven Steel Concrete system of construction, have received many additional orders for large buildings in New York, Brooklyn, among which may be mentioned the Imperial Hotel, St. Paul, 60th street and Columbus avenue, Central Realty Company, 36th street and Seventh avenue and several others. Mr. Wight stated that the demand for this product was phenomenal, and beyond doubt many orders had been received exceeding any ever placed heretofore. The fabric is of high carbon drawn steel and is laid from wall to wall without splicing. It has made the record in all tests, and this fact, together with the growing demand for fire-proof construction has been a very important factor in the success attained.

LATEST NEWS FOR CONTRACTORS

Bids Wanted for Municipal Work—Franchises Granted—Contemplated Improvements—Contracts Awarded

PAVING

Portland, Me.—Orders have been passed for the macadamizing of two streets and the paving with granite blocks of nine other streets, also for vitrified brick paving at three street intersections. E. H. Hunt.

Cambridge, Mass.—Orders for the extension of Arcadia street at a cost of $1,800 and the grading of Commercial street, at a cost of $4,500 have been adopted by the Council.

Mansfield, Mass.—$1,500 was voted for the construction of a new road in the town, at a recent town meeting.

Pittsfield, Mass.—It is reported that a bond issue of $100,000 for street paving during the coming year was voted at a recent election.

Quincy, Mass.—The Mayor has been authorized to petition the Legislature to appropriate $200,000 for building a state boulevard along the shores of Quincy Bay to the Blue Hills.

Springfield, Mass.—$225,000 has been appropriated by the Council for the extension of Court Square.

Pittsburg, Pa.—The widening of Second avenue is desired and surveys have been made looking to this end.

Toledo, O.—The paving of Willow avenue will soon be undertaken and bids are asked until January 5th. City Clerk Nauts.

Nashville, Tenn.—$26,000 has been appropriated for the paving of two streets.

La Porte, Ind.—The bids which were received for macadamizing the roads have been rejected.

Ludington, Mich.—$20,000 in bonds have been issued for improving two streets.

Chicago, Ill.—Six streets have been ordered paved at a cost of $162,500.

Madison, Wis.—Bids are wanted until January 3d for improvements on two streets. City Clerk Norsman.

Columbus, O.—The cost of improving Oregon avenue with brick is estimated at $4,821. If macadamized the price will be $3,570.

Fort Meyer, Va.—A macadam road will be constructed and bids for this work are asked until January 10th. Capt. W. F. Clark, Q. M.

Huntersville, Va.—The improvement of Church street being a necessity, a committee has been appointed to look into the matter. J. S. Coleman.

Birmingham, Ala.—It will be necessary to pave five streets with brick and four with asphalt in the near future. City Engineer Kendrick.

Tuskegee, Ala.—Bonds to the amount of $100,000 have been voted to improve the roads and bridges.

Springfield, Ill.—In 1903 about $69,000 worth of paving will be carried out, and as much again is looked for before the end of the year.

Topeka, Kan.—Petitions ask for twenty-five blocks of two-course brick paving, the plans of which will be ready about February 1st. City Engineer McCabe.

Buffalo, N. Y.—The following bids were received for repaving 17th street from Connecticut and Vermont, 128,389 yards: German Rock Asphalt & Cement Co., with asphalt, $2,116; Barber Asphalt Paving Co., asphalt, $1,937; with brick, $3,284; with stone, $4,734; H. P. Burgard, with asphalt, $1,900; brick, $3,500; stone, $4,000; Jorn Munn, brick, $4,000.

Buffalo, N. Y.—The following bids were received for repaving South Division street, from Ellicott to Michigan, 2,704 square yards: German Rock Asphalt & Cement Co., asphalt, $4,590; Barber Asphalt Co., asphalt, $4,326; brick, $6,706; stone, $9,518; H. P. Burgard, asphalt, $4,000; brick, $7,300; stone, $8,700.

Buffalo, N. Y.—Bids were received for repaving Niagara street from Hertel to Bridge over Cornelius Creek—7,268 square yards, 60 feet wide, as follows: With asphalt, German Rock Asphalt & Cement Co., $12,282; Barber Asphalt Paving Co., $11,483; H. P. Burgard, $11,000. With brick, Barber Asphalt Paving Co., $17,807; H. P. Burgard, $19,775; John Munn, $19,985. With Medina sandstone, Barber Asphalt Paving Co., $26,165; H. P. Burgard, $23,500.

Fort Worth, Tex.—Bids for paving Houston street with asphalt or brick were as follows: A. Ochander & Sons, brick, No. 1 foundation, $1.77½ per square yard; No. 2 foundation, $1.90; excavation, 18 cents. Brown & Dabnay, No. 1 foundation, brick, $1.95; No. 2 foundation, $2,25; excavation, 50 cents. Parker Washington Co., asphalt, No. 1 foundation, $2.07¼; No. 2 foundation, $2.22; brick, No. 1 foundation, $1.70; brick, No. 2 foundation, $1.95; excavation, 60 cents. With rock asphalt on No. 1 concrete, five years' guarantee, the price was $2.00; with No. 2 concrete, the same guarantee, $2.15. Rock asphalt, No. 1 concrete, ten years' guarantee, $2.07; with No. 2 concrete, same guarantee, $2.22. The Barber Asphalt Company bid $1.98 for American limestone and sandstone No. 1 foundation with asphalt; No. 2 foundation, $2.11; excavation, 48 cnts.

Fort Meyer, Va.—Bids will be received January 10, 1903, for the construction of macadam roads. Bids should be addressed "Proposals for Road," Capt. W. F. Clark, Q. M.

Union Centre, N. Y.—It is desired to build a macadam road from Union Centre to Maine, and surveys are about to be made for the same.

Rodman, N. Y.—This town has petitioned for the construction of two sections of road, each two and one-half miles long, under the Higbee-Armstrong law.

Toledo, O.—Bids are wanted January 5th for furnishing material and improving a portion of Willow avenue by paving with block on a 6-inch concrete or 8-inch sand foundation, or with asphalt block on a 6-inch bank gravel or broken stone foundation. City Clerk Charles H. Nauts.

Findlay, O.—A petition has been circulated for the paving of West Crawford street with brick.

Chicago, Ill.—The Board of Local Improvements has ordered portions of thirteen streets paved with asphalt at a cost of $350,000. Centre avenue was ordered paved with brick at a cost of $11,500, and West 67th street with brick at a cost of $13,000.

Manistee, Mich—Th survey of the branch of the Manistee County Road from a point on the main line four miles out from Manistee to Portage Lake and Onekama, a distance of seven miles, has been completed by Col. E. W. Muenscher. The grading and claying of this line will be put under contract next spring, and possibly a considerable amount of macadamizing on the main line.

New Castle, Ind.—The residents of South Main street have signed a petition to pave that thoroughfare early in the spring. It is probable that brick will be used for same.

Madison, Wis.—Bids are wanted January 3d for furnishing material and grading, curbing and paving with asphalt on a portion of Mifflin street. O. S. Norman, City Clerk.

Oklahoma City, O. T.—A petition has been circulated by the property owners of East Reno street for the paving of that street with asphalt.

Fort Worth, Tex.—City Engineer John B. Hawley states that the following bids were opened November 21 for brick and asphalt paving on Houston street, work to include 8,000 cubic yards of excavation, 3,000 feet free haul, and contracts were awarded December 1 as follows: With concrete foundation of gravel with American Portland cement (Dallas) 6 inches thick, vitrified brick paving, O. Kauder & Sons, Texarkana, Tex., $1.77½ per cubic yard; excavating at 48 cents per cubic yard; Parker Washington Company, Kansas City, Mo., $1.70 per cubic yard; excavating 60 cents. (10,000 yards brick awarded.) Brown & Dabney, Dallas, Texas, $1.95 per cubic yard; excavating, 50 cents; with concrete foundation of crushed rock with American Portland cement (Dallas) 6 inches thick; vitrified brick paving, O. Kauder & Sons, Texarkana, Tex., $1.90 per cubic yard; Parker Washington Co., $1.95 per cubic yard; Brown & Dabney, Dallas, Texas, $2.25 per cubic yard. For asphalt paving with concrete foundation of gravel with American Portland cement (Dallas) 6 inches thick, Parker Washington Company, $2.07 per cubic yard; Barber Asphalt Paving Co., $2,24½ per cubic yard; $1,98 for Indian Territory rock asphalt. For asphalt paving with concrete foundation of crushed rock with American Portland cement (Dallas) 6 inches thick, Parker Washington Company, $2.22, using either sheet asphalt or Uvalde, Tex., rock asphalt; excavating, 60 cents per cubic yard; (15,000 yards rock asphalt awarded). Barber Asphalt Paving Company, $2.37½ for sheet asphalt; $2.11 for Indian Territory rock asphalt; excavating, 48 cents.

WATER WORKS

South Paris, Mo.—It is reported that the plans for new works have been prepared, as the contract for furnishing the city will soon expire. A. W. Walker.

Barre, Vt.—A new charter for a water supply has been asked by the city.

Brookfield, Mass.—Plans for works were reported as being prepared by Nathan Craig, of Spencer, Mass.

Worcester, Mass.—It was recently reported that the Department of Water would build the Kettle Brook dam at a cost of $120,000.

Bridgeport, Conn.—It was stated early in December that Rudolph Hering, of New York, was preparing a report on the proposed filtration plant.

Niagara Falls, N. Y.—City Engineer Walter McCullough made a report on the new works, which are greatly needed. This includes a filtration plant, the whole to cost $500,000.

Laurel Springs, N. J.—The Laurel Springs Water Company was incorporated with a capital of $100,000 by S. S. Cord, Penngrove, N. J. At any time bids may be asked for works, which are to cost $43,000.

Hyndman, Pa.—It is stated that the Citizens Water Company was incorporated with a capital of $15,000.

Lancaster, Pa.—A vote will be taken in February on the question of new water works for the city. If this is not done a thirty-year contract will probably be let the American Spring Water Company for $30,000 a year. Mayor Cummings.

Meadville, Pa.—The city is about to put in a new ground water supply, and it was stated that 7,000 feet of 20-inch mains and a pumping station were wanted. The cost was placed at $75,000.

York, Pa.—Dr. Brose is interested in a company which was to build water works.

Delmar, Del.—The question of works has been discussed and an effort will be made to raise the required sum.

Baltimore, Md.—The council has under consideration sites for the new

reservoir which was to cost $350,000. Additional improvements were to be made to the work, costing $300,000.

Lexington, Va.—It was stated last month that the Council has determined to install water meters in the houses.

Kingwood, W. Va.—A franchise for works has been asked by outside parties. J. S. Brome, City Recorder.

Arcadia, Fla.—It was recently voted against issuing bonds for works.

Baton Rouge, La.—It was stated that the Baton Rouge Water Company determined to extend its works at a cost of $65,000.

Lake Charles, La.—The Fresh Water Canal Company has been incorporated with a capital of $200,000, and an irrigation plant is to be built.

Memphis, Tenn.—The city has voted to buy the works of the Artesian Water Company for $1,096,000 in cash and $1,250,000 for the mortgage.

Sheffield, Tenn.—A thirty-year franchise for works was recently granted Parsons' Sons & McIntyre, of Tuscombia, Ala.

Columbus, Ga.—Robert L. Johnson, Superintendent Public Works, writes us that it was voted on December 4th to issue $250,000 worth of bonds for municipal work. Plans will at once be made for the carrying out of their construction.

Barnesville, O.—Plans for works have been made by J. P. Force, Columbus, Ohio.

Toledo, O.—In January the Council will probably receive a report on the question of a pure water supply for the city. William Clark, of Toledo, is one of the experts.

Elkhart, Ind.—The city has purchased the works of the Elkhart Water Company. H. E. Bucklen.

Peru, Ind.—A report of the water supply of the city was submitted by the Health Board of the state, which recommended that a new supply be secured.

Marinette, Wis.—A vote will be taken next spring on the question of buying the works of the City Water Works Company.

Lewis, Ia.—It was recently voted here to build water works.

Austin, Minn.—This place decided to issue $25,000 in bonds to buy the works.

Duluth, Minn.—The city will come into possession of the water works of the West Duluth Company about the first of January.

Meeteetse, Wyo.—Works were recently voted, according to reports.

Shelbina, Mo.—According to local reports an election will probably be held in the spring to vote on $24,000 worth of bonds for water works.

Black Rock, Ark.—The Business Men's League wants a proposition for the building of works and an electric plant. E. T. Irby, Secretary.

Sioux Falls, S. D.—Bids were asked in December for $50,000 worth of bonds to be used for installing water works.

Durango, Colo.—It was voted in December to issue $150,000 in bonds for water works.

West Rutland, Vt.—It is reported that a bill has been passed by the House incorporating the West Rutland Water Company.

New Castle, Del.—As this place desires to install new water works, the taxpayers have been considering means to borrow money by bonding the city. The city will own the water works at the end of twenty years.

Yonkers, N. Y.—The construction of a filtration plant near the tube well station has been under consideration by the Board of Water Commissioners.

Boone, Ia.—City Engineer Charles E. Russell has been authorized by the City Council to prospect for the purpose of obtaining a water supply from shallow wells.

Wausau, Wis.—Prof. Erasmus G. Smith, of Beloit Sanitary Laboratory, has recommended a filtering plant for the city water system, at a cost of $25,000.

Baton Rouge, La.—The city desires to purchase the plant of the City Water Works Company, and has made an offer of $75,000 for the same.

Cody, Wyo.—Surveys and estimates have been made at this place for a system of water works. The probable cost is $16,000.

Watonga, O. T.—$16,000 in bonds for works were voted in December.

Soerabaya, Java.—The Javasche Electriciteits Maatschappy, voorheen Hekking & Co., of Amsterdam, Holland, are to put in a water supply plant at Soerabaya, Java, and desire to get in touch with American supply men in this line of work. The plant will be built for the Indian Government, but the conduits in the houses are to be made by the inhabitants themselves. Consequently there will be a large field for all water pipe fittings, closets, taps, sanitary goods, baths, etc., etc.

East Orange, N. J.—Arrangements have ben completed by the Orange Water Company and the Newark Board of Works and East Orange will operate its own water works plant. Heretofore this place was paid $80 per million gallons to the Newark people.

Ocean City, N. J.—The annual meeting of the Ocean City Water and Sewer Companies was recently held, and it was decided to spend $10,000 for improvements before next season.

Newark, N. Y.—Local reports state that there is a sentiment among the citizens of this place in favor of the purchase of the present plant, or the construction of a new plant to be owned by the village. The contract with the Newark Water Works Company will expire in October, 1904.

Coatesville, Pa.—The Borough Council of this place has had under consideration asking the voters to authorize a loan of $50,000 for the purpose of improving the water and sewer systems of the Borough.

Scotia, N. Y.—It is reported that a survey has been completed for the village water works, which will be constructed next summer. The new reservoir will have a capacity sufficient for 20,000 population.

Kingman, Kan.—The bonding of the city to the amount of $35,000 for the construction of water works has been under construction by the citizens of this place.

Denver, Colo.—A. L. Fellows, Hydrographer, U. S. Geological Survey, stated that the construction of the Gunnison tunnel will depend upon the decision of the Secretary of the Interior. The work as planned provides for one tunnel, four miles long, and one tunnel of two miles, with perhaps fifty miles of canal. The estimated cost is $1,500,000.

Egan, S. D.—It is reported that this village has been projecting a water works system, the estimated cost of which is to be $6,000.

Wenatchee, Wash.—Press reports state that a new system of water works will in all probability be constructed next summer, the source of supply to be the Wenatchee River.

Horseheads, N. Y.—Plans have been completed for gravity works. The water supply will be secured from Jackson Creek. About 16 miles of water mains, a reservoir and 70 hydrants will be required.

Oneonta, N. Y.—A contract has been let the Oneonta Water Works Company to furnish this place with a water supply for five years at $27.50 a year each for 98 hydrants.

Schenectady, N. Y.—About 500 water meters will be installed. Supt. Ingersoll.

Schuylerville, N. Y.—It is probable that this place will soon vote on the issue of $10,000 worth of bonds for completing the works. Village Engineer Geer.

East Orange, N. J. The city has refused to buy the works of the Orange Water Company, and it is reported that they have been making arrangements for the construction of new works in the spring. The improvements will cost $300,000. There will be 52 miles of mains. City Engineer Reimer.

Trenton, N. J.—The immediate construction of a filtration plant at the reservoir is urged. F. B. Lee, Chairman Commission.

McKeesport, Pa.—Additional wells for an increased water supply are reported to have been proposed by the water commissioners.

Parkside, Pa.—The Parkside Water Supply Company has been incorporated with a capital of $5,000.

Pittsburg, Pa.—An extension to the water mains, to cost $200,000, has been asked by the residents of the 22d Ward. $10,000 has been appropriated for hydrants. Councilman Stevenson.

Durban, W. Va.—The Pocohontas Water, Light & Power Company has been incorporated with a capital of $25,000. E. M. Arbogast, of Marlington, is one of the incorporators.

New Orleans, La.—Bids are asked until January 10th for a temporary water system and electric plant at the naval station. M. T. Endicott, Bur. Yards, Washington, D. C.

Knoxville, Tenn.—It is proposed to issue bonds for improvements to the works, sewers, etc., at this place. Mayor McTeer.

LaFollette, Tenn.—It is stated that a proposition for works to cost about $250,000 has been under consideration by the Council.

Lawrenceburg, Tenn.—The question of works and an electric light plant will soon be voted upon. Plans are now being prepared.

Morgantown, Ky.—Bonds for the proposed works, will soon be sold, according to reports.

Paris, Ky.—The Paris Water Co. will build a new filter plant.

Taylorville, Ky.—Press reports state that the question of works has been under consideration.

Alton, Ill.—Estimates for extending the works are reported as being made by the city engineer.

Chicago, Ill.—$200,000 will be asked for improving the pumping stations. Bids will be asked about March 10th for such hydrants, valves, etc., as may be required during the year.

Clinton, Ill.—Reports state that plans and specifications for the proposed works are being prepared.

Wausau, Wis.—The construction of a filter plant to cost $25,000 has been recommended.

Cumberland, Ia.—The contract for works has been awarded to S. G. Hunter, at $5,350.

St. Paul, Minn.—The Snake River Water Company has been incorporated with a capital of $50,000. A. A. Erickson, of St. Paul, is one of the incorporators.

Helena, Mont.—Bonds to the amount of $614,000 have been voted by the city to buy the works or build a new plant.

Dillon, Mont.—Plans for works to cost about $60,000 have been completed by Engineer Kelsey.

El Reno, O. T.—It is reported that the El Reno Water Company intends to build new works.

El Reno, O. T.—Press reports state that in the spring the city will vote on the question of building works.

Geary, O. T.—Bonds for works have been sold and plans for the same are now being prepared.

Durant, I. T.—This city will soon vote on the question of issuing bonds to the amount of $65,000 for works, and $15,000 for a school house.

Portland, Ore.—Works for Milwaukee, a suburb of this city, is under consideration. F. H. Lechler is chairman of the Water Committee, P. O. Portland.

Corona, Cal.—The Temescal Water Company proposes to build a new pumping station.

Trucker, Cal.—The McGlashan Water Company has been incorporated with a capital of $30,000.

St. John, N. B., Canada.—This city will extend the water mains in the spring, at a cost of $9,000.

Erie, Pa.—Preliminaries have been started for the proposed extension of the present intake from the crib in Erie Bay through Presque Isle and into Lake Erie. The work of the engineer will probably not be finished before next spring. George H. Fenkell, Engineer in Charge.

Buffalo, N. Y.—It is recommended by Commissioner of Public Works Ward that $70,000 be expended for ten new boilers, with fittings, at the water works plant.

Atlantic City, N. J.—The City Council has been asked by the Water Commissioners to issue $150,000 worth of bonds for the purpose of covering the cost of increasing the capacity of the water plant, as well as making numerous improvements.

Richmond, Va.—The recommendation of the Water and Finance Committee in reference to the issue of $405,000 in bonds for the erection of settling and coagulating basins and the construction of a standpipe in the western part of the city, was adopted by the Common Council.

Findlay, O.—The time for receiving bids for laying 10.6 miles of 24-inch vitrified pipes or 10.6 miles of 20-inch cast iron pipe, was postponed, in order that tests for a water supply at a point nearer the city might be made.

Hinsdale, Mont.—The Rock Creek Canal Company, with principal place of business at Hinsdale, has been incorporated with a capital of $9,600. William M. Wooldridge is one of the incorporators. They propose to build ditches canals and flumes for irrigation purposes.

Los Angeles, Cal.—The Imperial Water Company No. 8 has been incorporated with a capital of $1,000,000. R. T. Perry is one of the directors.

Colorado Springs, Col.—The special water committee is reported to have adopted a plan known as the El Paso tunnel, for unwatering the Cripple Creek District. The estimated cost of the work is between $80,000 and $100,000. Suerwood Aldrich.

Two Harbors, Minn.—At a recent special election the issue of water and light improvement bonds to the amount of $24,000 were authorized by the Council.

Oshkosh, Wis.—The Oshkosh Water Works Company has filed an amendment to its articles of incorporation, increasing its capital stock from $200,000 to $300,000.

Austin, Minn.—A loan of $25,000 to this city has been authorized by the State Board of Investment, for the purpose of purchasing a water works plant.

Jersey City, N. J.—The Consolidated Water Company, principal office, Corporation Trust Company, 15 Exchange place, Jersey City, has been incorporated with a capital of $2,000. John B. Stocker is one of the incorporators.

Sheffield, Tex.—Parsons Sons & McIntyre have been granted a thirty-year franchise for water works.

Vicksburg, Miss.—An amendment to the charter of Vicksburg, has been approved by the Governor, which gives the city the right to issue $300,000 worth of municipal bonds for the purpose of building water works, sewerage, city hall, etc.

LIGHTING

Bangor, Me.—Press reports state that the East Branch Dam Co. has sold its property to a syndicate, of which Frederick W. Ayer is a member, and that the plant will be greatly improved.

Bar Harbor, Me.—The Bar Harbor Electric Light Company and the Ellsworth Electric Light Company may be purchased by a western syndicate when a central plant will be established at Ellsworth and the system extended.

Burlington, Vt.—It is reported that the Senate has authorized the city to issue $150,000 in bonds for a municipal electric light plant.

Binghamton, N. Y.—A separate building for the proposed county heating and lighting plants has been recommended by County Custodian Back. The cost is estimated at $20,000.

Franklinville, N. Y.—The electric light plant was sold to the Empire Mfg. Co. recently, and it was stated then that a 100-horse power engine and 1,000-light generator and a duplicate set of machinery would be installed.

Medina, N. Y.—Local reports state that a dam will be constructed for the purpose of supplying water power to generate electricity. A. L. Sweet is the promoter.

Oneida, N. Y.—It is stated that in November bids were received from the Madison County Gas & Electric Company for lighting the streets. For $65,000 a year the company offered to supply seventy enclosed arc 1,200-candle lights on moonlight schedule up to one o'clock A. M., and thirty lights to burn all night. For $7,160 a year, seventy enclosed arc 2,000-candle power, to burn as previously stated and thirty to burn all night; for $7,350, the number of lights given in the first proposition would be supplied for all and every night and for $8,300 the lights in proposition number two would be furnished all and every night.

Ovid, N. Y.—The purchase of the Ovid Electric light plant or the cost of a new plant was to be ascertained by a committee, of which Benjamin Franklin was a member.

Bellevue, Pa.—A contract for furnishing light for a term of five years was let to the Ohio Valley Light Company at $80 per light per year.

Bethlehem, Pa.—Reports state that the Wyandotte Gas Company contemplates making large additions to their plant.

Edwardsville, Pa.—Two companies contested for the town lighting franchise recently, and the matter was referred to a committee.

Pittsburgh, Pa.—The capital stock of the Manufacturers' Light and Heat Company was increased from $5,000,000 to $10,000,000. A number of improvements are to be carried out. President H. B. Beatty.

York, Pa.—The Merchants' Electric Company, with a capital stock of $300,000 has been formed. Charles H. Bear, President.

Aberdeen, Md.—A contract for street lighting for five years was recently awarded to a company of which D. B. Arthur is president.

Washington, D. C.—It is reported that work was recently begun on a $3,000,000 electric power plant at the falls of the Potomac. The Washington Railway Company holds the title to the land.

Grafton, W. Va.—A company has been organized to operate a gas distributing system, and $150,000 in pipes will be spent.

Brooksville, Fla.—An electric light and telephone franchise was awarded the Standard Pole and Tie Company, 44 Broad street, New York. Plants will be established.

Bay St. Louis, Miss.—It was proposed to issue $3,000 worth of bonds for an electric light plant.

Wesson, Miss.—A local paper is endeavoring to have a municipal lighting plant established.

Marysville, Ky.—The Blue Grass Traction Company, it is stated, will build a $100,000 power house.

Manchester, O.—It was recently voted to issue $7,000 in bonds for a municipal electric light plant.

Portsmouth, O.—It is reported that the Portsmouth Street Railway & Electric Light Company may erect a power house in the spring.

Crystal Falls, Mich.—It is stated that the municipal lighting plant may be enlarged soon.

Superior, Wis.—The Highland Canal and Power Company will build a dam across the St. Louis river for the purpose of securing water power to generate 30,000 horse power.

Reinbeck, Ia.—W. P. Walsh, Grundy Centre, is promoting an electric light plant and water works for this place.

Sweetwater, Tex.—A franchise for an electric light plant has been let R. A. Wilkinson, of Sweetwater. J. W. Scott is the mayor.

Chewelah, Wash.—It is reported that an electric plant and water system is proposed.

Plattsburg, Mo.—The Plattsburg Light & Power Company has been incorporated with a capital of $40,000. This company proposes to supply electric light, power and heat. M. J. Trimble is one of the incorporators.

Jasper, Ala.—It is reported that J. M. Cranford and associates have been granted a franchise for an electric light plant by the Mayor and Board of Aldermen.

Las Vegas, N. M.—It is reported that the Commissioners of San Miguel County have granted to the Capitol Power & Lighting Company, a franchise for an electric light system and railway. The company proposes constructing a power plant on the Pecos River.

Guayaquil, Ecuador.—Bids are wanted February 12th, by the Secretary of the Municipality, for lighting the streets with gas or electricity, using 15.4-candle power international units, and in the streets in the centre of the city, 80-candle power. 14,000 lights, 11 hours daily, will be used. Electric conductors must be placed underground.

Mt. Union, Pa.—It is reported that W. H. Mundy has secured a franchise for an electric light plant.

Boyerstown, Pa.—Local reports state that the Council has been petitioned for a franchise for an electric light plant by Deem Brothers. Arc lights will be furnished at $65 per year, and incandescent lights at $18.

Palo Alto, Pa.—The Palo Alto Electric Company is about to apply for a charter. This company proposes to supply light, heat and power in the borough. Charles P. King and D. J. Duncan are interested.

Elwood, Ind.—The Citizens Heat & Light Company, of Elwood, has been incorporated with a capital of $200,000. Jacob Roomis, Herbert P. Carpenter, William A. Mason and other residents of Elwood are the principals.

Hayward, Wis.—T. S. Whitten, J. H. Hellweg and Henry Murphy have incorporated the Hayward Electric Light and Power Company with a capital of $25,000.

Brooklyn, Iowa.—The Brooklyn Lighting and Heating Company has been incorporated with a capital of $10,000. J. F. Hatcher, R. J. Breckinridge and others are interested.

Niles, Ill.—It is reported that the Niles Electric Light & Power Co., of Niles, has been incorporated with a capital of $5,000. Julius H. Geweke is interested.

Baraboo, Wis.—Local reports state that the Baraboo Lighting Company of this place has been incorporated with a capital of $100,000. Beeme H. Stone is one of the incorporators.

Hot Springs, Ark.—On January 12th bids will be opened by the Board of Public Affairs for furnishing arc electric lights, of not less than 1,600 c. p. for a period of ten years from January 1, 1904, on an all night schedule. Hamp Williams, Secretary.

Pittsfield, Me.—The Sebasticook Power Company has been capitalized at $50,000, and applied for a charter. Allen Hackett, President.

Brattleboro, Vt.—The Legislature has granted the Connecticut River Power Company leave to erect a dam across the Connecticut River at this place. This dam will be 20 feet high.

Newburyport, Mass.—The Newburyport Gas and Electric Light Company has petitioned for authority to issue additional stock to the amount of $150,000.

Chambersburg, Pa.—It is reported that the five arc-light machines at the municipal plant and the 148 arc lamps which light the town, are worn out, and that the expenditure of between $6,000 and $7,000 will be necessary to replace them.

Fort Deposit, Md.—The Fort Deposit Electric Company intend to spend at least $5,000 for increasing the capacity of their plant by 300 lights. New dynamos, boilers, etc., are to be put in.

Washington, D. C.—S. C. Bragaw has been granted an electric light plant franchise.

Roanoke, Va.—It is reported that surveys have been made with the object of increasing the water power of the Roanoke Navigation & Water Power Company.

Winston-Salem, N. C.—It is reported on local authority that surveys have

been made for the purpose of developing the water power at Yadkin River Shoals.

Cheraw, S. C.—This place has under consideration the question of electric lights. Mayor Benton.

Barnesville, Ga.—Public improvements, including electric light and water works plants, will be made at this place, for which the city has voted to issue $10,000 worth of bonds.

Richmond, Va.—Press reports state that the Council is considering a resolution for the construction of a municipal lighting plant.

Savannah, Ga.—It is reported that the Mutual Gas Light Company will extend its plant.

Quincy, Ill.—The Quincy Gas and Electric Company will expend about $50,000 in the improvement of its electric plant, according to press reports.

Sterling, Ill.—The electric plant of the Sterling Gas and Electric Light Company will be improved and enlarged, according to local reports.

Portage, Wis.—It is stated that the city is considering the purchase of the electric plant of J. W. York & Co. The plant has been appraised at a value of $10,316. There is a possibility that the city may install a new plant and use the pumping engine as the source of power. The cost of a new plant is estimated at $6,000.

Renville, Minn.—The matter of installing an electric plant at this place has been considered by a committee.

Kalispell, Mont.—Within the next few months, according to press reports, the Big Fork Electric Power & Light Company will install additional machinery in the power house at Big Fork, more than doubling the present capacity of the plant.

Tuscumbia, Ala.—Water works and an electric light plant will soon be installed in this city, according to reports.

Jackson, Miss.—It is reported that a company is being organized for the establishment of an electric light plant here. Address Thos. Brown.

St. Joseph, Mo.—It is reported that the present power plant of the St. Joseph Railway, Light, Heat & Power Company is not adequate to handling the business in the manner that the company desires, and they therefore intend to enlarge it materially. Bids as follows for the construction of electric lighting plants for the insane asylum, city hall, and poor house, and for electric elevators for the new city hall, were opened: Engine for city hall, Chase Engine & Manufacturing Company, $13,453; generators, Westinghouse Electric Company, $12,750; conduits, Abbott-Gamble Construction Company, $4,900; engines, insane asylum, Brownell & Co., $3,330.40; generators, Westinghouse Company, $5,800; pole lines, Acme Electric Supply Company, $1,263.71; three elevators, city hall, Otis Elevator Company, $11,716.

Lake Village, Ark.—Frank Strong and others have been granted a 25-year exclusive franchise for electric light purposes.

Trenton, Tenn.—The purchase and probable enlargement of the electric light plant at this place is under contemplation by the city.

Danville, Ky.—The Council advocates the installation of electric lights.

Columbiana, O.—The O. K. Oil and Gas Company and the Youngstown and Southwestern Railroad have negotiations in progress looking toward the erection of a power house at the Zion Valley gas well.

Portsmouth, O.—The erection of a new power house is under consideration by the Portsmouth Street Railway & Electric Light Company, the work on which they hope to begin in the spring.

Elgin, Ill.—The lighting department of this city will ask for an increase of $15,000 for expenses for the coming year. Of this sum $6,000 is desired for a new 100-H. P. boiler and new alternating dynamo. Another $6,000 is to be used for placing some of the wires underground.

Magnolia, Ark.—It is said that active work will be begun on the plant of the Magnolia Light Company, which has been incorporated with a capital of $15,000.

Walnut Ridge, Ark.—It is probable that bids will be received about the first of March for the electric plant which it is proposed to erect at Walnut Ridge. The cost of this plant is estimated from $50,000 to $75,000 and will be capable of furnishing 2,400 16 to 32-c. p. lights. The company has been organizing and will in all probability be known as the Walnut Ridge & Noxie Light, Power & Transit Company. It proposes to furnish light and water to Noxie as well as this place, and it is the expectation of the company also to lay two miles of electric railway.

Raton, N. M.—The capital stock of the Raton Electric Light & Power Company has been increased from $20,000 to $40,000.

Tulsa, I. T.—A franchise for an electric light and power plant has been applied for by Robert T. Epperson of this place.

Spokane, Wash.—Extensive improvements to the plant of the Spokane Falls Gaslight Company are being planned by the company, according to press reports.

Sumpter, Ore.—Local reports state that an electric power plant will be installed at the Columbia Mine. The plant will be located on Fruit Creek, below the mill, and will generate 300 H. P.

Orange, Cal.—A special election of the citizens of this place was ordered to vote on an issue of bonds for electric lights and water works.

Pomona, Cal.—The Board of Trustees have been petitioned to call a special election, one of the purposes of which will be a bond issue of $40,000.

San Luis Obispo, Cal.—The San Luis Gas and Electric Company expect to move their entire plant soon and combine with their gas plant. They propose to improve and increase both plants at a cost of $60,000.

NEW BUILDINGS.

Batavia, N. Y.—It is stated that the Board of Managers of the State School for the Blind at this place, have decided to erect a power house, heating plant and laundry, at a probable cost of $30,000.

Carthage, Ill.—Local reports state that the Hancock Board of Supervisors have decided to erect a court house, which will cost about $75,000. George W. Carlisle, of Ferris, Chairman of the Board of Supervisors.

Ishpeming, Mich.—It is probable that a $15,000 Carnegie library will be built at this place in the spring.

Decorah, Ia.—It is reported that bids are wanted January 6th for the purchase of $75,000 in bonds for a court house. F. A. Masters, County Auditor.

Columbus, O.—It is stated that the citizens of Franklin County recently voted to issue $250,000 worth of bonds to erect a memorial building.

Houston, Tex.—Bids will be received until February 2d for the construction of a city hall and market house combined—a two-story brick building, which will cost $80,900. The plans for this building were prepared by George E. Dickey & Co., of Houston. City Secretary D. D. Bryan.

Grand Junction, Colo.—It is stated that bids are wanted on the 23d of January for erecting a stone and brick jail.

Winnipeg, Manitoba.—Plans and specifications will be received until the 15th of January by the Chairman of the Special Library Committee for erecting a Carnegie library on William avenue. This is to be faced with Manitoba stone, and the cost, including the fixtures, is not to exceed $75,000. $300 will be given for the first plan, $200 for the second plan, and $100 for the third plan. The architect whose plans and specifications shall be selected is to give his personal attention to the supervising of the work. City Clerk C. J. Brown.

Geneseo, N. Y.—Bids will be received until January 30th for construction, electric lighting, plumbing and gas fitting and heating of a library building at the State Normal School at this place. Charles R. Skinner, State Superintendent of Public Instruction, Albany.

Camden, N. J.—A school house will be erected at this place in the spring. The cost of same will be $50,000.

Greenville, Pa.—It is reported that the School Board has under consideration the advisability of erecting a school at a cost of about $60,000.

Glenville, O.—It is stated that the citizens of this place have voted to issue $65,000 worth of bonds for the purchase of a site and the erection of a high school.

Hartford, Conn.—Plans for a new state armory, to cost $250,000, were submitted by Browne & Van Buren, of New Haven.

Braddock, Pa.—The plans of E. J. Carlisle for a school building have been accepted by the Board. It will cost about $85,000.

Philadelphia, Pa.—Reports state that the new state hospital site was about decided upon.

Washington, D. C.—Bids are wanted January 12 for a physical laboratory for the National Board of Standards. James Knox Taylor, Treasury Department.

Selma, Ala.—The new government building, for which a site has been secured, will cost $75,000.

Des Moines, Ia.—A contract for the Appanoose County court house is to be let in January. Smith & Gage, Youngerman Building, Des Moines.

Oklahoma, O. T.—It was voted recently to issue $100,000 for school houses. T. H. Harper, Clerk Board of Education.

Oakland, Cal.—The Council Committee has been considering plans and specifications for a city hall.

San Bernardino, Cal.—The plans of Burnham & Bleisher, Los Angeles, were accepted by the library trustees for the Carnegie library.

Brockton, Mass.—The plans prepared by Charles A. Brigham, 8 Exchange Place, Boston, for a high school building, have been approved. The cost is placed at $180,000.

Buffalo, N. Y.—An appropriation of $70,000 will be asked by the trustees of the City and County Hall, for improvements to the building. The installation of electricity is now under consideration, in place of gas now used.

Gloversville, N. Y.—Bids for the new post office building will doubtless soon be asked.

Syracuse, N. Y.—According to reports, contracts will be awarded about the first of February for the Onondaga county court house. The building will be fire-proof and will have elevators, steam heating and fan ventilating systems. Archimedes Russell, Arch., The Bastable.

Carbondale, Pa.—Congressman William Connell has introduced a bill for an appropriation of $100,000 for a public building at this place.

Scranton, Pa.—Plans for the new buildings for the almshouse at the Hillside House have been approved. These provide for three buildings, two of which will be of brick two stories high. The cost is estimated at $150,000.

Scranton, Pa.—Plans for a new high school have been prepared. This building is to be four stories high, 85 x 135 feet, fire-proof. The cost is placed at $100,000. A separate plant will be provided for the heating, lighting and power. The contracts will probably be awarded about the first of February.

Louisville, Ky.—Plans for the building of two school houses have been approved by the school board. The cost will be $50,000 each.

Cincinnati, O.—Bids for the construction of the western pumping station of the new water works will be called for as soon as the plans and specifications are completed. The buildings will be two stories high and cost about $500,000. The engine house will be 353 x 65, the boiler house 268 x 60, and a tower and two tall smokestacks, all of stone construction, will be erected.

Marion, Ind.—$100,000 has been appropriated for the construction of a new jail.

Lincoln, Ill.—$50,000 has been ordered levied for the first of three years' assessments for the construction of a new court house.